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A SYSTEM
OF
OPERATIVE SURGERY:

BASED UPON THE PRACTICE OF

SURGEONS IN THE UNITED STATES:

WITH A

BIBLIOGRAPHICAL INDEX AND HISTORICAL RECORD OF
MANY OF THEIR OPERATIONS,

DURING A PERIOD OF TWO HUNDRED AND THIRTY-FOUR YEARS.

BY

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SURGEON TO THE ST. JOSEPH'S HOSPITAL;
FELLOW OF THE COLLEGE OF PHYSICIANS, PHILADELPHIA, ETC.

SECOND EDITION,

WITH

NUMEROUS ADDITIONS IN BOTH THE TEXT AND ILLUSTRATIONS,

MAKING NEARLY ONE THOUSAND ENGRAVINGS ON STEEL

IN TWO VOLUMES.

VOL. I.



PHILADELPHIA:
J. B. LIPPINCOTT AND CO.,
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TO

CHARLES A. POPE, M.D.,

PROFESSOR OF THE PRINCIPLES AND PRACTICE OF SURGERY, AND OF CLINICAL SURGERY,

IN THE

MEDICAL DEPARTMENT OF THE ST. LOUIS UNIVERSITY,

The following Pages are respectfully Dedicated,

AS AN

ACKNOWLEDGMENT OF HIS DEVOTION TO THE PROGRESS OF SURGERY IN THE UNITED STATES,

AND AS

A TESTIMONIAL OF THE RESPECT AND ESTEEM OF HIS

SINCERE FRIEND,

THE AUTHOR.



PREFACE TO THE SECOND EDITION.

THE constant republication by the American press of the works of European surgeons, and their general adoption as Text-books by our medical schools, having tended to instruct the junior members of the profession in the results of foreign practice, rather than in the opinions and acts of their own countrymen, the desire was excited to counteract this tendency by presenting them with a treatise on Operative Surgery which should exhibit some of the more marked proceedings of surgeons in the United States.

These views having led to the publication of the first edition, have also been adopted as the basis of the present one, the rapid exhaustion of the work (although from its illustrations it was necessarily more costly than most medical books) having shown that the enterprise was favorably received by the Profession.

But, whilst endeavoring to exhibit the results of American operations, the more valuable portion of those of European surgeons have received their full share of attention in this as in the former edition, there being no desire on my part to exclude their acts from proper consideration.

In the publication of the present edition, the effort has been made to augment its value by the correction of former errors of judgment and of the press, as well as by the addition of such operative proceedings as have been the result of the progress of surgical science; and though the period between the publication of the two editions has been almost too brief to permit the expenditure of a large amount of time, except after attending to the urgent demands of daily practice, the entire work has been thoroughly revised, and each subject augmented or remodelled in accordance with the views and experience of surgeons at the present time.

The additional matter thus introduced having added 269 pages

to the former number, the work has been published in two volumes, in order to prevent its becoming too cumbrous for daily use at the dissecting-table.

The first twenty-eight plates have also been handsomely re-engraved by Mr. Illman, of Philadelphia, and many new illustrations added.

The Bibliographical Index has been brought up to January, 1854, by the addition of 366 new references, and it now includes the titles of 1,228 works and papers on surgical subjects, as well as the volume, page, title, and year of the journal, or place in which they were published.

The principal additions to the text will be found in the articles on Etherization; Resection of both Superior Maxillæ; Tracheotomy in Epilepsy, &c.; Polypi in the Larynx; Pharyngeal Tumors; Retro-Pharyngeal Abscess; Treatment of Aneurism by Compression, Galvanism, &c.; Resection of the Scapula; Hydatids of the Liver; Hernia; Stricture of the Urethra; Puncture of the Bladder; Lithectomy; Litholiby; Vesico-uterine Fistula; Movable Cartilages in the Knee-joint; Ligature of Arteries; Resections and Amputations.

With these modifications of form and substance, the work is again presented to the Profession, in the hope that its value will be found to be augmented by the labor bestowed on it.

PREFACE TO THE FIRST EDITION.

To the majority of those commencing the study of medicine, few subjects are possessed of greater interest, or surrounded by a more pleasurable excitement, than operative surgery.

With some few exceptions, every young man, at an early period of his pupilage, regards the performance of an operation as the highest test of professional acquirements, and under the impression that his knowledge of it is to be obtained by observation, is always anxious to embrace every opportunity of witnessing the efforts of an operator. Whilst, therefore, chemistry displays her secrets, and physiology tenders him in vain the principles of his profession, the surgeon, when limited to the least scientific portion of his duties, is always sure of a numerous audience, who, under the impression that they will be fully prepared to follow in his footsteps, simply by observing his course of proceeding, will readily repeat their visit whenever he can offer them a similar inducement.

Having, from long intercourse with medical classes, had many evidences of the existence of this condition of mind, and having, like many others, learned that seeing an operation and performing it are very different acts, the author has wished to lead the reader to a more correct estimate of the means by which operative skill is to be acquired, and sought, in the following pages, to furnish him a guide which might also serve as an instructor, whilst performing for himself the operations which he desires to study. In special anatomy, few have ever acquired a thorough knowledge of the structure of the body until, by constant manipulation, they have been able to separate each portion for themselves; and in surgery, the same course must certainly be pursued. Study, observation, and the repeated demonstration of another are, doubtless, valuable aids to the acquisition of knowledge, but, unless seconded by per-

sonal practice, they will all pass away as "the baseless fabric of a vision."

The following pages are, therefore, presented to the Profession, in the hope that they may invite more general attention to the necessity of acquiring a knowledge of operative surgery by practising, upon the subject, such processes as it is desired to master; while, at the same time, drawings have been added in order to facilitate the progress of those who cannot, at the moment, obtain the necessary material for repeating the operation.

In many portions of the work, the descriptions furnished will be found to be given in as condensed a form as seemed compatible with clearness, and have been thus presented in order to prevent the volume becoming too cumbersome for constant use. In addition to which, the author has not desired to go over ground which has so recently been well displayed by writers both in Europe and this country. Many details of history, pathology, physiology, and surgical proceedings which are essential to a complete treatise upon the subject have, therefore, been designedly omitted in this as not coming within the scope of its plan.

Although the idea of an instructor cannot be claimed as a novel one, having, in the hands of Messrs. Malgaigne and Fergusson, been most happily illustrated, there has yet been no work issued by the press which has presented the American practitioner with a comprehensive view of the opinions, operative methods, and instruments of those of his countrymen who have given to American surgery a character of its own.

At present, little more than two hundred years have elapsed since the first surgeon stepped upon our shores; yet, during that time, many acts have been performed that will favorably compare with the brightest achievements of the surgeons of Europe. To record these points and save them from unmerited oblivion, has been a pleasant duty in connection with the composition of the volume.

In its formation, the author is under many obligations to various sources, which he hopes he has suitably acknowledged. Basing his description of any operation chiefly on the views of his own countrymen, he has yet felt bound to display along with them the opinions of such European authorities as are universally received as sound; and to facilitate a judgment on the part of those whose knowledge might not be sufficient for the formation of an opinion of the value of the different methods referred to, he has appended

to the account an estimate of their advantages. This estimate, he wishes it to be distinctly understood, is founded solely upon his own opinion, based upon the experience acquired during a devotion of seventeen years, under auspicious circumstances, to the study and practice of a favorite branch of his profession.

To the liberality of the publishers, Messrs. Lippincott, Grambo, & Co., is due the opportunity of presenting a series of illustrations, that must materially contribute to the reader's comprehension of descriptions, the details of which might otherwise be difficult to follow.

For the accuracy and finish of the engravings, he is indebted to Mr. John M. Butler, of Philadelphia, who has zealously exerted himself for the perfect execution of his part of the undertaking. To the latter gentleman is also due the author's acknowledgment of the untiring good nature with which all the alterations and renewed criticisms on his work have been received during the progress of the engraving.

In selecting the illustrations, various sources have been resorted to, but upon none has the author relied more than on the beautifully finished plates of Messrs. Bernard & Huette. Wherever, in any instance, previous figures did not present such views as were desired, the aid of the Daguerreotype has been invoked, and original drawings made with all the accuracy of the scene at the moment. In employing the illustrations of other writers, the effort has been made to credit accurately the original authority; but this having often proved a matter of impossibility, the author has merely attached the name of the work from which he has taken them. Heister, Froriep, Blasius, Seerig, Dupuytren, Sir Charles Bell, Labat, Gensoul, Serre, Bourgery, and Jacobson, and Pancoast, have all drawn, more or less, from the same sources as Messrs. Bernard & Huette; but most of them have so transferred from work to work the result of their labors, that, with one or two exceptions, it is not easy to trace their origin.

For an opportunity of consulting the many works required in connection with the Bibliographical Index, as well as with the matter embodied in the text, the author is indebted to the valuable libraries of the Pennsylvania and New York Hospitals, to the Loganian portion of the Philadelphia Library, and to the private collections of many friends. To the Librarian and Library Committee of the Pennsylvania Hospital he is under especial obliga-

tions for the free use, at all hours, of their valuable and extensive collection.

To Dr. John C. Warren, of Boston, and also to his son, Dr. J. Mason Warren, is due the acknowledgment of the aid afforded by an extended manuscript, as well as by a collection of pamphlets which have furnished much valuable information in connection with the surgery of Boston. From the *American Journal of Medical Sciences*, edited by Dr. Isaac Hays, there has also been gained many scattered facts connected with the doings of the surgeons of this country.

In describing the anatomical relations of the various parts concerned in the different operations, reliance has been chiefly placed upon the accounts furnished in the *Anatomie Topographique* of Blandin, as well as on that given in the *Special Anatomy and Histology* of Dr. Wm. E. Horner, of the University of Pennsylvania.

In bringing his labors to a close, the author also recalls many acts and suggestions on the part of friends which he cannot properly specify, and which he regrets he did not note at the moment.

Hoping, at some future time, to have the opportunity of remedying this, as well as some other omissions connected with the press, he cheerfully submits the volume to the judgment of the Profession in the belief that it will be received as a contribution to facilitate the progress of those who have yet to acquire their surgical experience.

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GENERAL HISTORY OF SURGERY.

A BRIEF HISTORICAL SKETCH OF SURGERY, ARRANGED CHRONOLOGICALLY.*

THE origin of Surgery, being coeval with that of Medicine, dates from the earliest periods of the human race, the reception of injuries naturally requiring that some effort should be made to alleviate them. That surgical operations were performed, at a very remote period, cannot be doubted, the laws of Moses, describing minutely the operation of circumcision (an operation yet practised among the Jews, according to ancient usages), and the embalming of Joseph, indicating the possession of at least such surgical knowledge as was necessary for the opening of bodies.

The earliest individual, directly spoken of in connection with the practice of surgery, and the reputed originator of the science, is the myth named CHIRON, the Centaur, who was supposed to have been born in Thessaly, at some unknown period.

Next, we find mention made of ÆSCULAPIUS, a son of APOLLO, B.C. 1142, who was believed to have been a pupil of CHIRON; and then we have more positive information, in the account by Homer of the events of the Trojan war, in which he describes PODALIRIUS and MACHAON as sons of ÆSCULAPIUS, and as surgeons in this war, B.C. 1184.

PODALIRIUS is reported to have been the first bleeder, having opened a vein in either arm of the daughter of the King of Caria, and received her hand in marriage as his recompense.

The ASCLEPIADES, or reputed descendants of Æsculapius, constitute the only surgeons spoken of during the ensuing 500 years.

* The facts here stated have been chiefly collected from Miller, Richerand, Sharp, Black, Chelius, and the Dictionary of Antiquities, by William Smith, LL.D.

After these came PYTHAGORAS, B.C. 608; and, after him, the following may be briefly mentioned in the natural order of time.

DAMOCEDES, a contemporary of Pythagoras, treated King Darius for a sprained ankle; and his queen, Atossa, for cancer of the breast.

After him came Hippocrates, the great father of medicine and surgery, from whom all the rest may be traced.

HIPPOCRATES, B.C. 460, or 357, was among the first of the distinguished surgeons, and practised many operations, often claimed as modern inventions. He employed the actual cautery of various shapes; used moxa made of rolls of flax; resorted to issues and tents as counter-irritants; and operated for calculi in the kidney by incision, though he did not cut for stone, lithotomy being then confined to a special class of practitioners. He also reduced dislocations and fractures by means yet resorted to; employed the obstetrical forceps for delivering the foetus; frequently employed the trepan in depressed fractures of the skull; resorted to percussion to prove the presence of fluid in the thorax, and performed empyema or paracentesis thoracis. He also wrote many excellent surgical treatises.

After him, DIOCLES CARYSTIUS invented an instrument for extracting darts, and bandaged the head for wounds, &c., by bandages often employed at the present time.

PRAXAGORAS, of Cos, who followed in his footsteps, also proved himself an accomplished surgeon, and some of his operations are yet resorted to. He incised the fauces freely in cases of inflammation; excised the uvula, and made an artificial anus, or opening into the bowels, in cases of obstruction or ilius. He also first observed, the difference between the arteries and veins, and noted the pulse, though this fact has also been claimed for Aristotle.

ARISTOTLE gave the name to the aorta, and showed that all the bloodvessels centred in the heart. After him came the anatomist and surgeon, HEROPHILUS, about B.C. 320, though the exact year is unknown. He was the first surgeon who practised dissections.

ERASISTRATUS, his contemporary, also dissected and invented many surgical instruments. This surgeon is reported to have reduced a dislocated humerus for Diodorus Cronus, and by this operation, to have convinced him of the possibility of the existence of *motion*, a fact which he had previously denied.

XENOPHON, his follower, was the first to arrest hemorrhage from the extremities, by a tourniquet, having recommended the encircling of the limb with a cord, in order to check the flow of blood.

Lithotomy, at this period, as during the time of Hippocrates, was avoided by the surgeons, and performed entirely by a special class of individuals who devoted themselves to this one operation.

AMMONIUS, surnamed *Αιθοτομος*, devoted much time to the study of calculous affections, employing an instrument to crush calculi, and thus becoming the first surgeon who operated for lithotripsy.*

CASSIUS, B. C. 96, exhibited considerable knowledge of the physiological action of the brain, having described the paralysis of one side of the body as induced by injuries of the opposite portion of the head.

CELSUS, the contemporary of Horace, Virgil, and Ovid, practised surgery at Rome in the beginning of the Christian era, upwards of 150 years before GALEN. He was the first to describe lithotomy, and his mode of performing it (central incision), as well as numerous other operations, is sometimes resorted to by surgeons of the present day. He described the operation of removing cataract by depression; mentions the subject of artificial pupil; gave accurate and judicious rules for the application of the trepan; was the first to notice that there might be an effusion and compression within the head without fracture; first recommended the application of ligatures to wounded arteries; improved the operations of amputation; applied caustics to the treatment of carbuncle; described several species of hernia; and operated for hare-lip, &c., by methods yet in use and often claimed as modern improvements.

ARETEUS, A. D. 54, reign of Nero, first employed blisters and resorted to cantharides as a vesicating agent. This surgeon condemned the operation for tracheotomy, lest the cartilages should not heal.

RUFUS, the Ephesian, A. D. 98—117, reign of Trajan, wrote on diseases of the kidneys and bladder, and operated by ligating the brachial artery for varicose aneurism at the bend of the arm.

HELIODORUS, the physician to Trajan, about A. D. 120, and contemporary with Juvenal, wrote on injuries of the head.

ANTYLLUS, about A. D. 340, recommended tracheotomy, which had been previously practised by the Asclepiades in threatened suffocation from diseases of the throat; he practised arteriotomy in great emergencies, and showed the importance of dividing an artery entirely across, in order to arrest hemorrhage, instead of incising it

* Smith's Dict. Greek and Roman Antiquity—Art. Chirurgie.

obliquely. In the treatment of aneurism, he tied the artery above and below the sac, and, opening the latter, allowed the wound to heal by granulations; he also alluded to the operation of cataract by extraction, and reported cures of hydrocele by incision.

CLAUDIUS GALEN, born in the autumn of A. D. 130, wrote upon luxations of the femur backwards, a variety not mentioned by Hippocrates; he also described spontaneous luxations of the femur, and trepanned the sternum in empyema.

ÆTIUS, about A. D. 475, scarified the legs in anasarca; employed the cautery; excised hemorrhoidal tumors; employed lithontriptics to dissolve calculi, and wrote on hernia, diseases of the testicle, and castration.

ALEXANDER, of Trallis, a surgeon of the time of Justinian, A. D. 545, wrote on diseases of the eye, and on fractures.

PAULUS ÆGINETA, about A. D. 670, is reported to have bled freely in cases of gravel. He opened abscesses by caustics; defined the points for paracentesis abdominis; sounded the bladder by the finger in the rectum, in cases of stone; cut on the left side of the raphé (lateral operation) in lithotomy, and believed aneurism to be caused by rupture of the coats of the artery. He extirpated the breast by a crucial incision; performed laryngotomy, and is said by some to have been the first to perform tracheotomy, though the Asclepiadæ had also the credit of the same operation. His incision was made transversely, instead of longitudinally, as practised at the present day. He performed the operation for strangulated hernia; was the first to treat of fracture of the patella, and originated embryotomy.

CALIPH HAROUN, among the Arabians, had charge of a hospital at Bagdad, about A. D. 790, where no fewer than six thousand students, chiefly Christians, are said to have attended the practice of the house, a number that has not been equalled by any of the more modern schools.

RHAZES, about A. D. 924, first described spina ventosa and spina bifida; he opposed all operations for cancer when the tumor was not entirely free from the surrounding parts, and cauterized poisonous wounds.

HALY ABBAS, A. D. 980, advised the application of caustics to hydrocele, and punctured the linea alba a little below the umbilicus in cases of ascites.

AVICENNA, A. D. 1000, distinguished between closure of the pupil

and cataract; preferred depression in cataract to extraction; first resorted to the flexible catheter, and also employed a saw similar to that now named after Hey.

ALBUCASIS, A. D. 1100, is supposed to have been the first who noticed the effect of a clot in the arteries in arresting hemorrhage; he describes an instrument of his own for curing fistula lachrymalis, and also the cataract needle of his own period. He also reports having operated for hydrocephalus, but with doubtful success; he removed tumors by the ligature, and first described lithotomy as performed on the female; in the male, he practised the lateral operation. He also excised the tonsils and uvula; extracted polypous tumors from the fauces; objected to any attempt at extirpating goitrous tumors; invented the probang; employed sutures in wounds of the intestines; condemned tracheotomy in acute inflammation of the windpipe, and when it had reached the bronchia, and strongly doubted the propriety of operating in cancerous tumors; *declaring that he never cured, or saw cured, a single case.* He also advised the partial evacuation of large abscesses, as subsequently practised in England by Abernethy and others, whose names were given to this plan of treatment.

POPE INNOCENT II., A. D. 1139, retarded the progress of surgery, by describing its practice as degrading, and forbidding the clergy to pursue it.

PITARD, A. D. 1271, established the College of Surgeons in Paris.

GILBERTUS ANGLICANUS and JOHN OF GADDESSEN, two surgeons of distinction, practised in England A. D. 1300, 1320.

GUY DE CHAULSAC, A. D. 1360, first described the Cæsarian operation.

JOHN OF ARDEN, A. D. 1370, operated very successfully for fistula; improved the trepan, and added the centre pin.

VALASCO DE TARANTA, A. D. 1410, practised at Montpellier, and first proposed the application of arsenic to the cure of cancer.

GERMAIN COLOT, surgeon of Louis XI., A. D. 1460, restored the operation of lithotomy to the medical profession by an act of the law.

A. D. 1440-1450 was distinguished by the discovery of Printing, which had a marked influence on the progress of medicine and surgery.

A. D. 1492, Discovery of America. It may, perhaps, specially interest the American student to know that syphilis was described

by Albucasis, Avicenna, Valasco, and John of Gaddesden, nearly 100 years before this period,* and that its origin in connection with the expedition of Columbus is by no means established.

VESALIUS, in A.D. 1550, taught anatomy; and EUSTACHIUS, in A.D. 1560, did the same.

AMBROSE PARÉ, in France, A.D. 1560, created a new period in surgery, both by his practice and writings. He wrote on gunshot wounds, firearms being first introduced at this period; employed ligatures more than the actual cautery, and first resorted to the twisted suture in hare-lip, copying the mode in which the ladies and tailors carried the thread and needle in their cuffs.

TALIAACOTIUS, an Italian, in A.D. 1597, revived and systematized the class of plastic or "Taliacotian" operations which had previously been practised in a very irregular manner by empirics.

FABRICIUS AB AQUAPENDENTE, A.D. 1610, the preceptor of Harvey, introduced the modern trephine, or the instrument now generally employed both in England and America; he also invented the the curved canula, which is employed after the operation of tracheotomy.

WISEMAN of England, A.D. 1676, the surgeon to Charles II., advocated immediate amputation in military surgery, and especially before fever set in.

JAMES YOUNG, of Plymouth, A.D. 1679, first proposed the flap amputation, since claimed by Verduin and Sabaurin, and first recommended that compression should be limited to the artery, in amputation.

FABRICIUS HILDANUS, A.D. 1653, of Germany, and SCULTETUS, each wrote an *Armamentarium Chirurgicum*, which includes a large number of surgical instruments illustrative of the practice of their own and preceding periods.

DIONIS, BELLOSTE, SAVIARD, and MOREL, in France, all practised surgery during the seventeenth century.

HEISTER, A.D. 1710, was highly distinguished as a surgeon, and wrote a voluminous and excellent work on the Practice of Surgery, to which modern surgeons are largely indebted.

DESAULT, of France, A.D. 1730, first taught surgical anatomy. This distinguished surgeon made many improvements in surgery; among others, he changed the curved amputating knife to the present

* See Lectures of Sir A. Cooper, by Lee.

straight one; first suggested the cure of artificial anus, by removal of the septum between the ends of the bowel, and also first proposed ligating the distal side of the tumor in aneurism.

PETIT, A. D. 1740, did much to advance French surgery; he invented the screw tourniquet, and was the first who operated for fistula lachrymalis by transfixing the sac.

LE DRAN, SABATIER, GARRANGEOT, LOUIS, and FRERE COSME were also eminent French surgeons during the eighteenth century.

HISTORY

OF

SURGERY IN THE UNITED STATES.

HISTORICAL RECORD OF SOME OF THE PRINCIPAL FACTS CONNECTED WITH THE ORIGIN AND PROGRESS OF MEDICINE AND SURGERY IN THE UNITED STATES, ARRANGED CHRONOLOGICALLY.*

THE history of Surgery in the United States is so closely identified with that of Medicine, as to render it useless to attempt to separate them; nor is it desirable to do so, the existence of surgery, as a distinct branch, being only the result of violence, both having naturally a common trunk. In practice, in the United States, any effort to accomplish this separation is also futile, the most distinguished surgeons having been, and yet being, in many instances, the most accomplished physicians of their respective localities.

As the United States of America, in their earliest periods, were colonized chiefly from Great Britain, the medical wants of the settlers were necessarily supplied by practitioners who emigrated with

* For the facts and dates furnished in this synopsis, I have drawn upon various authorities, but especially upon the following writers:—

American Medical Biography, or Memoirs of Eminent Physicians who have flourished in the United States, by James Thacher, M. D., Boston, 1828.

Annual Address ("On American Medicine before the Revolution"), delivered before the Medical Society of the State of New York, Feb. 1842, by John B. Beck, M. D., President of the Society.

A Review of the Improvements of Medicine in the Eighteenth Century, by David Ramsay, M. D., Charleston, 1800.

American Medical Biography, or Memoirs of Eminent Physicians, &c. &c., by Stephen Williams, M. D., Greenfield, Mass., 1845.

History of Kentucky Surgery, by S. D. Gross, M. D., Louisville, Ky., 1853.

them from Europe. A large number of the first emigrants being also those who left their homes on account of religious persecutions, we find that many of our early physicians united the clerical function with the practice of medicine, or were colonial officers, who, whilst regulating the body politic, also undertook the treatment of the physical derangements of the hardy colonists.

The following facts, though mainly of local interest, and specially connected with the origin of the profession in particular towns, are yet deemed worthy of general notice, as showing the condition of the medical profession in this country during a period of over 200 years.

In 1620, the United States of America was a wilderness. In 1850, it had more than 40,000 practitioners of medicine, and a population of 25,000,000 souls. As this population in many of the States is very widely scattered, the practice of medicine in some sections of the country frequently occupies so much time, as to leave the practitioner comparatively little for such labor as would tend to the formation of a National Medical Literature. Notwithstanding this, an examination of the medical and scientific journals will clearly show that, though often overtaxed corporeally, American physicians have made a creditable effort to record and publish the results of their individual observations; so that those, who in our large cities were more favorably situated for mental labor, have been able to collect and exhibit such an amount of facts, as has given to the American profession the credit of having originated some most useful plans of treatment.

In surgery, especially, do we notice the suggestion of operations of an original character, which, whilst benefiting the community at large, have also tended to advance the interests of the profession, by leading to the development of other operations of an analogous character. As examples of these, I would cite the operations of Ovariectomy, by McDowell, of Kentucky; of Resections of the Lower Jaw, by Deaderick, of Tennessee; of Ankylosis of the Knee and Hip-Joint, by Barton, of Philadelphia; of Extirpation of the Parotid Gland, by Warren, McClellan, &c., all of which have been operations of sufficient brilliancy and utility to have invited the attention of foreign surgeons.

Although the engagements of the American practitioner have often been constant and onerous, the profession appears to have enjoyed its full share of health and long life, as compared with that obtained by those engaged in other pursuits. From an examination

of some of the statistics furnished by Dr. Stephen Williams, and published in his *Medical Biography*, it appears that the practice of medicine in the United States, though very laborious, is not unfavorable to a long life. Out of 1060 practitioners, who had been Fellows of the Massachusetts Medical Society, 1 died at the age of 100 years, 34 were upwards of 80, and 119 were between 50 and 80.

Thacher, in his *Biography*, also reports 3 who died between 90 and 100 years of age, 23 between 80 and 90, 7 between 85 and 90, 27 between 70 and 80, and 29 between 60 and 70 years of age—so that out of 148, whose names he has collected, almost one-half have lived over the period of threescore years and ten, or that usually allotted to man. Nor has this advanced age been always accompanied by mental debility; on the contrary, many of the American physicians have possessed active minds to the last. Thus, Dr. John Huss, of Durham, N. H., who died at the age of 108, was very vigorous; and Dr. Holyoke, of Mass., retained his intellectual vigor until his one hundredth year, having, in 1821, when 92 years old, operated for paracentesis abdominis.*

The first record of the presence of a physician, as a resident of this country, is found in the settlement of Virginia, where, in 1608, one year after the settlement of the colony, Dr. WALTER RUSSEL arrived from England.

In 1620, Dr. SAMUEL FULLER, a deacon in the church of the Rev. John Robertson, arrived at Plymouth in the first ship with the Puritans.

In 1635, Dr. THOMAS THACHER came over from England, and subsequently published the first American medical work.

In 1637, Dr. JOHN FISK arrived and settled at Salem as a clergyman and physician.

In 1638, Harvard University, of Massachusetts, was founded. Many of its early collegiate graduates, after obtaining medical degrees in Europe, returned to practice their profession in their native country, bringing with them the views and practice of their European teachers, and thus establishing the practice of medicine in this country on the basis of that taught during their pupilage in the European schools.

In 1642, SAMUEL BELLINGHAM and HENRY SALTONSTALL graduated in the arts at Harvard University, but took their degree of M. D. in Europe.

* Williams's *Biography*.

In 1644, we notice that Dr. THOMAS OLIVER is spoken of, in the Journal of Governor Winthrop, as "a skilful surgeon."

In 1649, a law was passed in Massachusetts, "regulating the practice of chirurgians, midwives, and physicians."

In 1650, Dr. JOHN GLOVER graduated at Harvard, and obtained a medical degree at Leyden. Dr. HOWARD did the same.

In 1651, Dr. ISAAC CHAUNCEY graduated at Aberdeen, Scotland, and then settled in Massachusetts.

In 1662, Dr. JOHN WINTHROP was made Governor of Connecticut. He was one of the founders of the Royal Society of England, being in London at that time as an agent for the colony.

In 1667, Dr. THOMAS THACHER, of Massachusetts, published a medical tract, entitled "A Brief Guide in the Smallpox and Measles," being the first medical publication in the country.

In 1669, Dr. HENRY TAYLOR, of Boston, practised surgery in that town, and "had his rate remitted for attending the poor."

In 1673, Dr. SAMUEL FULLER was appointed Surgeon-General to the Forces.

In 1674, Dr. EDMUND DAVIE, of Harvard, obtained the degree of M. D. at Padua.

In 1682, Dr. THOMAS WYNN and brother, Welsh physicians, located themselves in Philadelphia, and were the earliest practitioners in this city.

In 1691, William and Mary College, in Virginia, was founded for the education of young men, but without any medical department.

In 1700, Dr. JOHN NICOLL, a graduate of Edinburgh, located in New York city.

In the same year, Dr. HAMILTON, a Scotch physician, settled in Maryland.

At the same period, Dr. JOHN MITCHELL, of England, settled in Virginia.

In 1700, Yale College, Connecticut, was founded.

In 1704, the first American Newspaper (the *Boston News Letter*) was published in the United States, and doubtless had its influence on the profession, in disseminating general information. The first printed newspaper (the *English Mercurie*) was published in England, in the reign of Queen Elizabeth, July 23, 1588, and a copy of it is now in the library of the British Museum. The *Boston News Letter*, which as just stated, was the first in the United States, was published 116 years subsequent to this. The second journal

in the United States was the *Boston Gazette*, and the third the *Philadelphia Weekly Mercury*; the latter two being published in 1719. The first number of the *Philadelphia Mercury* may be seen in the Loganian portion of the Philadelphia Library, Philadelphia.

In 1705, Dr. JOHN CLAYTON, of England, settled in Virginia.

In 1707, Dr. GRÈME came over with the governor, and settled in Philadelphia.

In 1712, Dr. GUSTAVUS BROWN, of Scotland, located himself at Port Tobacco, Maryland, and was the most distinguished practitioner of this and the adjoining State.

In 1716, Dr. WILLIAM DOUGLASS, of Scotland, emigrated to New England.

In 1718, Dr. COLDEN, of Scotland, settled in New York.

In 1720 or 1730, Dr. LLOYD ZACHARY, one of the founders of the Pennsylvania Hospital, commenced practice in Philadelphia.

In 1720, Dr. COLDEN wrote an account of the climate and diseases of New York city, recommending it as especially favorable to consumptive patients.

In 1721, Dr. BENJAMIN COLMAN, a clergyman of Boston, published a pamphlet on Inoculation, defending the practice as introduced by Dr. Boylston, of that place.

In 1721, Dr. COTTON MATHER introduced Inoculation in Boston. Experiments were also made by Dr. Boylston in June, 1721, upon his own family. This practice created such inflammatory conduct on the part of the other physicians and the populace as to endanger their lives. The first case, Lady Mary Wortley Montague, was inoculated in England, in April, 1720, only one year previously.

In 1725, Dr. BOYLSTON was handsomely received at court in London, and was the first American who was elected a fellow of the Royal Society. The ensuing year, he published in England, at the request of the Royal Society, "An Historical Account of the Smallpox, as inoculated in New England."

In 1730, Dr. NATH. WILLIAMS wrote on the Practice in Smallpox.

In 1732, Dr. WALTON published an essay on Fever.

In the same year, Dr. THOMAS HOWARD published a treatise on Pharmacy.

In 1734, Dr. WILLIAM BULL, of North Carolina, after studying under Bôerhaave, graduated at Leyden, and wrote on Lead Colic.

In 1736, Dr. WILLIAM DOUGLASS published "The History of a new Epidemical Eruptive Fever" which prevailed in New England in 1735, 1736.

In 1736, Dr. DOUGLASS employed Calomel in the treatment of Inflammation. This practice has been claimed for Dr. Robert Hamilton, of England, but his attention, it is well known, was not called to it until 1764.

In the same year, Dr. JOHN TENENT, of Virginia, published an account of the Polygalia Senega.

In 1737, 1741, 1742, Dr. JOHN MITCHELL, of Virginia, treated Yellow Fever by copious bleedings.

In 1740, Dr. MAGRAW, of Scotland, settled in New York city.

In the same year, Dr. THOMAS CADWALADER, of Philadelphia, published an "Essay on the Iliac Passion," recommending mild purges and opiates instead of the violent treatment previously pursued.

In 1741, Dr. COLDEN published an account of the Fever which prevailed in New York; also, a paper on Cancer.

In 1743, Dr. JOHN MITCHELL, of Virginia, published letters on the Yellow Fever of 1741, in Virginia; also, on "The Causes of different Colors of People in different Climates."

In the same year, Dr. CLAYTON published the "Flora Virginiana," which was deemed so valuable that it was republished by GRONOVIVUS, at Leyden, in 1762.

In 1746, Dr. COLDEN, Lieutenant-Governor of New York, gave Madeira wine freely in Yellow Fever, with much success.

In 1746, Princeton College, New Jersey, was founded.

In 1748, Dr. JOHN LINING, of Charleston, published a description of the American Yellow Fever.

In 1749, Dr. JOHN MOULTRIE, of Charleston, graduated at Edinburgh, being the first native Carolinian who obtained this honor.

In 1750, Drs. JOHN BARD and PETER MIDDLETON injected and dissected the body of a criminal for the instruction of the students, being the first Dissection recorded in the United States.

In 1752, the Pennsylvania Hospital was established in Philadelphia, being the first general hospital in this country. Its surgical wards, under the charge of Drs. Physick, Hartshorne, Parrish, Barton, and others, has always largely contributed to the advancement of surgical practice.

In the same year, patients were received into its wards.

In 1753, Dr. JAMES LLOYD, after enjoying the instruction of Warner, Sharpe, Smellie, and Hunter, of London, settled in Boston, and was the first systematic practitioner of Midwifery, &c. in that section.

In 1754, Dr. LIONEL CHALMERS, of Charleston, wrote a paper on Tetanus, then very prevalent in that city, recommending bleeding, the warm bath, and opiates.

In the same year, Dr. THOMAS BOND, of Philadelphia, wrote an Account of a Worm found in the Liver.

At the same period, Dr. Bond was actively engaged as a medical officer in the Pennsylvania Hospital.

In 1755, Drs. ANDREW ROBINSON and JAMES CRAIK came over as surgeons to Braddock's army, and settled in Virginia.

In 1756, Dr. WILLIAM SHIPPEN, Jr., of Philadelphia, returned from Europe, and commenced practice in his native city. In 1765, he was elected Professor of Surgery in Philadelphia, and was the first Professor of Surgery in the United States.

In 1759, inoculation was generally adopted in Philadelphia.

In the same year, Dr. JOHN BARD, of New York, published several papers on Yellow Fever, and on the Pleurisy, which prevailed on Long Island in 1749.

In 1759, Dr. BOND wrote on the Use of Bark in Scrofula.

In 1760, the General Assembly of the Province of New York ordained that no person should practice in the city of New York as a physician or surgeon before he had been examined and approved by one of his majesty's council. During the same year, Dr. WILLIAM DOUGLASS published a summary of the progress and planting of the British settlements in America, which contained a notice of the state of the medical profession.

In 1763, Dr. JOHN MORGAN, of Philadelphia, graduated at Edinburgh, and maintained in his inaugural essay that *Pus was a Secretion*. The credit of this doctrine has usually been assigned to Mr. John Hunter, but there is no doubt of his having been anticipated by Dr. Morgan.*

In 1765, the Medical Department of the University of Pennsylvania was organized and located in Philadelphia. No school of

* Dr. James Curry, Lecturer at Guy's Hospital, in referring to the priority of this opinion of Dr. Morgan, says: "I cannot avoid giving the merit to Dr. Morgan, who discussed the question with great ingenuity in his Inaugural Dissertation on taking his degree at Edinburgh in 1763, and I can find no proof that Dr. Hunter taught, or even adopted such an opinion until a considerably later period."

See also Cullen's "First Lines," by Charles Caldwell, M. D., vol. i. p. 225, note by Dr. Caldwell.

Also, Lond. Med. and Phys. Journ. for 1817, and New England Journ. of Med. and Surgery, vol. vi. p. 401. (Quoted from Dr. Beck.)

medicine had existed in the United States prior to this period, though Dr. WM. SHIPPEN, of Philadelphia, lectured in Philadelphia, on Anatomy, during the three preceding years. Dr. Shippen was the first Professor of Surgery in this school, which in 1768, furnished ten graduates in medicine. Since then it has contributed largely to the medical education of the whole country; very many of the Professors in the numerous schools now scattered over the United States, looking back to this school as their Alma Mater.

In the same year, Dr. MORGAN delivered an address on "The Institution of Medical Schools in America," at the first commencement of the University.

In 1768, Columbia College, New York (then King's), was founded.

In the same year, Dr. CHALMERS, of Charleston, published an "Essay on Fevers," and in 1776, "Meteorological Observations taken at Charleston, from 1750 to 1760."

In 1769, Dr. KEARSLEY, of Philadelphia, wrote a paper on Angina Maligna.

In the same year, Dr. PETER MIDDLETON, of New York, delivered an address "On the State of Medicine," at the opening of King's College, New York. Dr. John Jones was the first Professor of Surgery in this college.

In 1769, Dr. SAMUEL BARD suggested the establishment of the New York Hospital. The building was erected in 1773, but destroyed shortly afterwards by fire when nearly completed, and did not receive patients until 1791. It is now, 1854, possessed of very extensive surgical wards, and contributes its full quota to the progress of surgical science.

In 1770, Dr. BAYLEY, a surgeon of New York, described* the False Membrane in Croup as the result of inflammation, and treated it by bleeding, tartar emetic, and calomel. The credit of this practice was incorrectly claimed for Dr. CHEYNE more than twenty years subsequently to Dr. Bayley's publication.

In 1771, Dr. SAMUEL KISSAM, of New York, published an inaugural essay "On the Anthelmintic Virtues of Cowhage."

In 1775, Dr. SAMUEL ADAMS, of Massachusetts, attended the soldiers wounded at Lexington, and Dr. MILES WENTWORTH, of Boston, was surgeon to the American prisoners wounded at the battle of Bunker Hill.

* New York Medical Repository, vol. xiv. p. 186.

In the same year, Dr. JOS. WARREN, an eminent surgeon of Boston (then a General), fell at the battle of Bunker (Breed's) Hill.

In 1775, Dr. JAMES THACHER, of Massachusetts, commenced his duties as Assistant-Surgeon among the wounded at Bunker Hill.

In 1776, Dr. JNO. MORGAN, of Philadelphia, received from Congress the appointment of Director-General of the U. S. Hospitals.

In 1776, Dr. JOHN JONES, Professor of Surgery in New York, published a volume on Wounds and Fractures, which was of much service to the army surgeons during the Revolution.

In the same year, Dr. BENJAMIN RUSH of Philadelphia, was a member of Congress, and one of the signers of the Declaration of Independence.

In 1777, Dr. CROSBY, a graduate of the University of Pennsylvania, was surgeon to General Washington's lifeguard.

In the same year, Dr. MERCER (then General) fell at the battle of Princeton.

In 1780, Dr. JOHN WARREN, surgeon of a military hospital in Boston, commenced a course of Anatomical Lectures, which are thought to have been the first given in that city.

In 1780, Dr. JAS. THACHER, of Massachusetts, was on duty as an army surgeon, at West Point, and witnessed the execution of the unfortunate Major Andrè. He was also present at the surrender of Cornwallis in the same year.

In 1781, Dr. JNO. WARREN amputated at the Shoulder-joint, being the first operation of the kind recorded in the United States. This amputation was also successfully performed by Dr. BAYLEY, of N. Y., assisted by Dr. WRIGHT, in 1782. His operation has been often referred to* as the first amputation of the kind performed in this country, but that of Dr. Warren preceded it.

In 1786, the Philadelphia Dispensary was established, being the first institution of the kind in the United States.

In 1787, the Philadelphia College of Physicians was established.

In 1792, Dr. PHYSICK, afterwards the most distinguished surgeon in this country, graduated at Edinburgh.

In 1794, Dr. Physick was elected one of the surgeons of the Pennsylvania Hospital.

In 1795, he invented the Stylet for cutting strictures of the urethra, and first operated for Lithotomy in 1797. In this operation,

* Thacher's Biography of Bayley.

he cut the internal pudic artery, and the difficulty of arresting the hemorrhage led, in 1802, to the invention of his needle and forceps for the ligature of this and other deep-seated vessels. Previous to this time, surgeons had deemed the ligature of the internal pudic a matter that was almost impossible.

In 1796, Dr. WRIGHT POST, of New York, tied the Femoral artery successfully for Aneurism, the patient living about thirty years subsequently.

In 1798, Dr. JOHN WARREN, of Boston, extirpated the Parotid gland, being the first operation of the kind known.

In the same year, Dr. NATHAN SMITH, who was celebrated for his surgical abilities, founded Dartmouth College, and was the sole professor for twelve years, lecturing on all the different branches; thus exhibiting a degree of industry and energy that has never been surpassed, all his courses of lectures being spoken of as "complete."

In 1800, Dr. WATERHOUSE, of Cambridge University, was the first who vaccinated in the United States; being one year after the discovery of Jenner.

In August, 1801, Dr. JOS. GLOVER, of South Carolina, who had graduated the previous year at the University of Pennsylvania, excised a large portion of the Spleen, which had protruded through a wound, and the patient rapidly recovered.

In 1802, Dr. JOHN C. WARREN, of Boston, commenced practice as a surgeon, and after fifty-two years of active life, still continues to take an interest in professional duties.

The same year, Dr. PHYSICK operated for the cure of False-joint, by introducing a seton between the ends of the bones. He ligated the brachial artery for varicose aneurism at the bend of the arm, in 1803.

In the same year, Dr. MASON F. COGSWELL, of Hartford, Conn., ligated the Carotid artery, in removing a scirrhus tumor from the neck; the patient, however, died on the nineteenth day. This is believed to be the first operation on this artery ever practised in the United States, and among the first three ever performed; Heberstreit, Abernethy, Cogswell, and Fleming being the first four surgeons who attempted the operation. The operation of Sir Astley Cooper was performed in 1805 for aneurism, and his patient also died on the nineteenth day.

In this year, Dr. JOHN C. WARREN ligated the Femoral artery. Previous to 1800, capital operations seem to have been rare or were

unrecorded, though, doubtless, the Revolution afforded many occasions for their performance by the surgeons of that period.

In 1805, Dr. McCLELLAN, of Franklin Co., Pa., extirpated the Parotid gland.

In 1806, Dr. WALTER BRASHEARS, of Kentucky, amputated at the Hip-joint successfully. This was the first operation of the kind known to have been performed in the United States.

In 1807, Dr. SAMUEL WHITE, of Hudson, New York, removed a Teaspoon from the Intestines, by incising the abdomen and opening the bowel; the patient recovered. In 1808, he also successfully extirpated the Parotid gland.

In 1809, Dr. PHYSICK operated for Artificial Anus, by inducing adhesion between the two sides of the bowel, and then dividing the septum.

In December, 1809, Dr. McDOWELL, of Kentucky, removed a large Ovarian Tumor through the abdominal parietes of three different patients, all successfully. This operation was the first of the kind ever performed in any quarter of the world, and was repeated by Dr. McDowell thirteen times.*

In 1810, Dr. DORSEY, of Philadelphia, tied the External Iliac, being the first time this operation was performed in America.

In the same year, Dr. DEADERICK, of Tennessee, amputated half of the Lower Jaw, being the first resection of this bone ever performed.

In 1811, Dr. MOSES SWEAT, of Maine, also extirpated a Parotid gland.

In 1812, Dr. STEVENS, of New York, ligated the External Iliac artery successfully.

In the same year, Dr. WM. GIBSON, then of Baltimore, ligated the Primitive Iliac in the case of a wound in the groin; and Dr. WRIGHT POST, of New York, about the same period, tied the Primitive Carotid artery, being the second or third time the operation was repeated in this country.

In 1812, Dr. EPHRAIM McDOWELL, of Kentucky, successfully Lithotomized James K. Polk, who was then a poor boy, though subsequently President of the United States.†

In 1813, Dr. CHARLES MCCREARY, of Kentucky, resected and excised the entire Clavicle successfully, the patient living thirty-five

* Gross, History of Kentucky Surgery.

† Ibid., Report on Kentucky Surgery.

years after the operation, and having the use of the limb. This was the first operation of the kind performed in the United States.* Dr. Mott's operation was performed fourteen years subsequently, without his being aware of Dr. McCreary's operation.

In 1814, Dr. BOWEN, of Providence, amputated at the Shoulder-joint.

In 1815, Dr. HUBBARD, of Connecticut, ligated the Axillary artery successfully.

In the same year, Dr. WHITRIDGE, of Sackett's Harbor, ligated the External Iliac artery. At the same period, Dr. WHITRIDGE also amputated, successfully, at the Shoulder-joint.

In 1816, Dr. HUNT, of Washington, excised the Head of the Humerus, and Dr. PHYSICK published an Account of the Advantages of Animal Ligatures in ligating arteries.

In 1817, Dr. WRIGHT POST, of New York, tied the Subclavian artery externally to the scaleni muscles, being the first successful operation performed on this vessel in the United States.

In 1818, Dr. VALENTINE MOTT, of New York, tied the Innominata, his patient living twenty-six days subsequently.

In 1818, Dr. GLOVER, of Charleston, performed the operation of tapping the head in a case of Hydrocephalus. This operation is believed to have been the only case published, either by English or American surgeons, since 1778.

In 1820, Dr. PHYSICK invented his instrument for Excision of the Tonsils. This instrument was so well adapted to the operation, that it has retained its position before the profession notwithstanding the introduction of numerous others.

In the same year, Dr. JOHN C. WARREN, of Boston, operated successfully for Staphyloraphy, being the first time it was performed in America.

In 1821, Dr. MOTT, of New York, amputated half the Lower Jaw after ligating the Carotid; being the second case in the United States, but the first published.

In the same year, Dr. ANTONY, of Georgia, resected the fifth and sixth ribs nearly entire.

In 1822, Dr. NEWMAN, of Pennsylvania, amputated the Tongue successfully for Lingua Vitula.

In 1823, Dr. A. H. STEVENS, of New York, resected nearly the entire Upper Jaw successfully; and in the same year, Dr. George

* Gross, Report on Kentucky Surgery.

McClellan, of Philadelphia, removed all the Lower Jaw from its angles forwards, for the relief of an osteo sarcomatous tumor. The specimen is now in the Museum of the Pennsylvania College of Philadelphia.

In 1824, Dr. DAVID L. ROGERS, of New York, also removed nearly the entire Upper Jaw.

In 1825, Dr. DUDLEY, of Kentucky, tied the Subclavian artery successfully.

In 1825, Dr. Geo. McCLELLAN, of Philadelphia, ligated the Carotid artery in three children, five, nine, and sixteen years old.

In the same year, he extirpated the Parotid gland, and repeated the operation on another patient in 1829.

In 1825, Dr. BUTT, of Virginia, resected and removed the entire *Radius* successfully.

In the same year, Dr. BRIGHT, of Kentucky, is reported to have successfully removed nearly the entire Rectum.

In 1826, Dr. RHEA BARTON, of Philadelphia, resected the Femur near the Hip-joint for Anchylosis, and established a false joint, upon which the patient walked.

In 1827, Dr. MOTT, of New York, ligated the Primitive Iliac artery successfully, and in another case removed the entire Clavicle.

In the same year, Dr. S. POMEROY WHITE, of New York (formerly of Hudson), tied the Internal Iliac artery.

In this year, Dr. AMASA TROWBRIDGE, of New York State, cured a case of Spina Bifida, by ligating the base of the tumor with a wire ligature.

In 1828, Dr. JOHN C. WARREN, of Boston, removed half of the Lower Jaw.

In 1829, Dr. J. KEARNY RODGERS, of New York, successfully straightened an anchylosed hip, by resection of the Femur.

In the same year, Dr. MOTT, of New York, relieved an Anchylosed Jaw by dilatation and incision of the soft parts.

At the same period, Dr. THOMAS HARRIS amputated half the Tongue successfully, and

Dr. GILLESPIE, of Virginia, successfully resected the Astragalus in a compound dislocation.

In 1831, Dr. DEPEYRE, of New York, operated for Lithotripsy, being the first surgeon who performed the operation in the United States.*

* N. Y. Med. Journ., Feb., 1851.

In 1831, Dr. BARTON removed nearly half of the Lower Jaw, but left the base of the maxilla as a rim of bone to preserve the outline of the face.

In 1833, Dr. MOTT ligated the right Subclavian artery *within* the scaleni muscles.

In the same year, Dr. HALL, of Baltimore, ligated the Innominate, but without success.

In 1834, Dr. THOMAS HARRIS resected the Elbow-joint.

In 1835, Dr. BARTON resected the Femur above the knee in a case of ankylosis, where the leg was bent at a right angle to the thigh, and straightened the limb so that the patient could walk.

In 1837, Dr. J. MASON WARREN, of Boston, successfully performed the Taliacotian operation for the restoration of a nose, being the first surgeon who performed this operation in the United States.

In the same year, Dr. MUSSEY removed the entire Scapula and Clavicle, in a case in which he had amputated the arm at the shoulder-joint six years previously.

In 1838, Dr. GEO. McCLELLAN removed the Scapula and Clavicle, as well as the entire limb of the same side.

In 1841, Dr. GURDON BUCK, Jr., of New York, resected the Elbow-joint.

In 1842, Dr. SCHMIDT, of New York, relieved Ankylosis of the Lower Jaw by a subcutaneous division of the masseter muscle.

In the same year, Dr. JOHN C. WARREN removed the Upper Jaw bone.

In 1844, Dr. JNO. WATSON, of New York, operated successfully for Oesophagotomy.

In 1845, Dr. BUCK, of New York, resected the Knee-joint, by excising a wedge-shaped portion of the patella, condyles, and articulating surfaces of the tibia.

In the same year, Dr. J. KEARNY RODGERS, of New York, tied the left Subclavian artery *within* the scaleni muscles.

In 1846, Dr. J. KEARNY RODGERS ligated the Internal Iliac artery successfully.

In the same year, the Inhalation of Ether for the purpose of destroying sensibility in surgical operations, was discovered by Dr. MORTON, of Boston, and brought into use by Dr. JOHN C. WARREN, of the same city.

In 1847, Dr. SWEAT, of Maine, amputated at the Hip-joint successfully.

In 1850, Dr. WILLIAM E. HORNER resected the entire half of the Upper Jaw, without making any external incision in the cheek.

In the same year, Dr. PAUL F. EVE, of Georgia, extirpated the entire Womb successfully.

In the same year, Dr. GROSS, of Louisville, resected nearly the entire Scapula.

In 1851, Dr. CARNOCHAN, of New York, resected (for necrosis) the entire Lower Jaw successfully, disarticulating it at both condyles.

In the same year, Dr. PEASLEE, of New York, performed Ovariotomy, and removed *both* ovaries successfully, by the large peritoneal section.

In the same year, Dr. GEO. HAYWARD, of Boston, published an account of several cases of Vesico-Vaginal Fistula successfully treated by his own method of operating.

In 1852, Dr. J. M. CARNOCHAN, of New York, cured, in six months, a case of Elephantiasis Arabium by ligating the femoral artery of the same limb.

In the same year, Dr. J. MARION SIMS, of Alabama (now of New York), reported several cases of Vesico-Vaginal Fistula cured by means of ingenious instruments, of his own inventing, closing the wound by the "Clamp Suture."



A
BIBLIOGRAPHICAL INDEX
OF
AMERICAN WRITERS,
ON

SUBJECTS CONNECTED WITH OPERATIVE SURGERY, FROM THE
YEAR 1783 TO THE COMMENCEMENT OF THE YEAR 1854—BEING
A PERIOD OF 70 YEARS—ARRANGED CHRONOLOGICALLY.

A System of Surgery extracted from the Works of Benjamin Bell, of Edinburgh; by Nicholas B. Waters, M. D.; with Notes and copper-plate engravings. 8vo. Philadelphia, 1791.

The Surgical Works of the late John Jones, M. D., 3d edition—to which is added a Short Account of the Life of the Author, by James Mease, M. D. 8vo. Philadelphia, 1795.

A Dissertation on the Properties and Effects of the Datura Stramonium, or Common Thorn Apple, and on its Uses in Medicine; by Samuel Cooper, M. D. 8vo. Philadelphia, 1797.

A Review of the Improvements of Medicine in the Eighteenth Century, by David Ramsay, M. D. 8vo. Charleston, 1800.

A Memoir concerning the Disease of Goitre, by Benjamin S. Barton, M. D. 8vo. Philadelphia, 1800.

Physical Investigations and Deductions from Medical and Surgical Facts relative to the Causes, &c. of the Diseases of a warm and vitiated Atmosphere, &c. &c., by William Barnwell, M. D. 8vo. Philadelphia, 1802.

A Treatise on Fractures, Luxations, and other Affections of the Bones. Edited by Xavier Bichat, with plates. Translated from the French by Charles Caldwell, M. D., with Notes, &c. 8vo. Philadelphia, 1805.

The Lectures of Boyer upon the Diseases of the Bones, arranged by A. Richerand, translated with Notes and additional plates by Joseph Hartshorne, M. D. 8vo. Philadelphia, 1805.

The Principles of Surgery, by John Bell, Surgeon, abridged by J. Augustine Smith, M. D. 8vo. New York, 1810.

A Dictionary of Practical Surgery, by Samuel Cooper, Surgeon; with Notes by John Syng Dorsey, M. D. 8vo. 2 vols. Philadelphia, 1810.

A Treatise on Ruptures, containing an Anatomical Description of each Species, with an Appendix, by Jos. Parrish, M. D. 8vo. Philadelphia, 1811.

The same, edited by Isaac Hays, M. D. 8vo. Philadelphia, 1843.

Elements of Surgery for the Use of Students; with plates, by John Syng Dorsey, M. D. 8vo. 2 vols. Philadelphia, 1813.

Observations on the Surgery of the Ancients, by David Hosack, M. D. 8vo. New York, 1813.

Memoirs of Military Surgery and Campaigns of the French Armies on the Rhine, in Corsica, &c. &c., from the French of D. J. Larrey. Translated by R. Wilmott Hall, M. D. 2 vols. 8vo. Baltimore, 1814.

A Treatise on Surgical Diseases, and of the Operations suited to them, by Boyer. Translated from the French by Alexander H. Stevens, M. D. 8vo. 2 vols. New York, 1815.

Medical Sketches of the Campaigns of 1812, '13, '14, on the Canadian frontier of the United States; to which are added Surgical Cases, Observations on Military Hospitals, &c., by James Mann, M. D. 8vo. Dedham, Mass., 1816.

A System of Surgical Anatomy. Part I. On the Structure of the Groin, Pelvis, and Perineum, by William Anderson, M. D. 4to. New York, 1822.

First Lines of the Practice of Surgery, by Samuel Cooper, Surgeon; from the fourth London edition, with Notes by Alexander H. Stevens, M. D. 8vo. 2 vols. New York, 1822.

A short Treatise on Operative Surgery, describing the Principal Operations, by Charles Averill; with Additions by John Bell, M. D. 12mo. Philadelphia, 1823.

Observations on the Surgical Anatomy of the Head and Neck, illustrated by Cases and Engravings by John Burns, London. Edited by Granville S. Pattison, Surgeon. 8vo. Baltimore, 1823.

Manual of Surgical Operations, by J. Coster, M. D. P. Translated by John D. Godman, M. D. 16mo. Philadelphia, 1825.

The Institutes and Practice of Surgery, being Outlines of a Course of Lectures by William Gibson, M. D. 8vo. 2 vols. Philadelphia, 1824. (Various editions since.)

A Treatise on Strictures of the Urethra, by Theodore Ducamp. Translated from the French by William M. Herbert, M. D. 8vo. New York, 1827.

On the Treatment of Anchylosis by the formation of Artificial Joints, by John Rhea Barton, M. D. 8vo. Philadelphia, 1827.

The First Lines of the Practice of Surgery, by Samuel Cooper, Surgeon; with Notes by Alexander H. Stevens, M. D., New York; with Additional Notes by a Physician in Philadelphia. 8vo. 2 vols. Philadelphia, 1828.

An Essay on the Diseases of the Internal Ear. Translated from the French, by N. R. Smith, M. D., with a Supplement by the Translator. 8vo. Baltimore, 1829.

Elements of Operative Surgery. Translated from the French of A. Tavernier, M. D., with copious Notes and Additions by S. D. Gross, M. D. Philadelphia, 1829.

A Treatise on Surgical Anatomy; or the Anatomy of Regions considered in its Relations with Surgery, &c., by Alfred A. L. M. Velpeau, M. D., &c. Translated from the French, with an Appendix, by John W. Sterling, M. D. 8vo. 2 vols. New York, 1830.

Drawings of the Anatomy of the Groin; with Anatomical Remarks, by William Darrach, M. D. Folio, Philadelphia, 1830.

The Anatomy, Physiology, and Diseases of the Bones and Joints, by Samuel D. Gross, M. D. 8vo. Philadelphia, 1830.

A Dictionary of Practical Surgery, by Samuel Cooper, Surgeon, &c.; with Notes, by D. M. Reese, M. D. 8vo. 2 vols. New York, 1830.

The same, from the seventh London edition, with a full Supplementary Index, containing much that is valuable in connection with American Surgery; as well as the modern European improvements. Two vols. in one, New York, 1849.

Medical and Surgical Memoirs, by Nathan Smith, M. D., late Professor of Surgery in Yale College. Edited, with Addenda, by N. R. Smith, M. D. 8vo. Baltimore, 1831.

Observations on Wounds and their Complications by Erysipelas, Gangrene, and Tetanus, and on the principal Diseases of the Head,

Eye, and Ear, by the Baron D. J. Larrey. Translated from the French, by E. F. Rivinus, M.D. 8vo. Philadelphia, 1832.

Surgical Anatomy of the Arteries, with plates and illustrations, by Nathan R. Smith, M.D. 4to. Baltimore, 1832.

A condensation of matter on the Anatomy, Surgical Operations, and Treatment of Diseases of the Eye, with remarks and plates, by John Mason Gibson, M.D. 4to. Baltimore, 1832.

The American Cyclopedia of Practical Medicine and Surgery. Edited by Isaac Hays, M.D. 8vo. 2 vols. Philadelphia, 1833-35.

Leçons Orales de Clinique Chirurgicale, faites à l'Hôtel Dieu de Paris, par M. le Baron Dupuytren. Translated from the French by A. Sidney Doane, M.D. Part I. 8vo. New York, 1833.

A Treatise on Topographical Anatomy, or the Anatomy of the Regions of the Human Body, comprising an Atlas of 12 plates, by Ph. Fred. Blandin. Translated by A. S. Doane, M.D. 8vo. and 4to. New York, 1834.

The Minor Surgery of Bourguery. Translated from the French, by William C. Roberts, M.D., and J. B. Kissam, M.D. 8vo. New York, 1834.

A Compendium of Operative Surgery, intended for the Use of Students, and containing Descriptions of all Surgical Operations. Illustrated by Engravings, by Thos. L. Ogier, M.D., and Thos. M. Logan, M.D. No. 1, 4to. and four colored lithographic plates, Charleston, 1834.

Medical and Physical Researches, or Original Memoirs in Medicine, Surgery, Physiology, &c. &c., by R. Harlan, M.D. 8vo. Philadelphia, 1835.

A Manual of the Diseases of the Eye, or a Treatise on Ophthalmology, by S. Littell, Jr., M.D. 12mo. Philadelphia, 1836, 1846.

Practical Observations on Strangulated Hernia and some of the Diseases of the Urinary Organs, by Joseph Parrish, M.D. 8vo. Philadelphia, 1836.

Surgery Illustrated, compiled from the Works of Cutler, Hind, Velpeau, and Blazius; 52 plates, by A. Sidney Doane, M.D. 8vo. New York, 1836.

A Treatise on the Malformations, Injuries, and Diseases of the Rectum and Anus. Illustrated with plates, by George M. Bushe, M.D. 8vo. New York, 1837.

The final report of a Committee of the Philadelphia Medical Society, on the construction of instruments and their mode of action

in the Radical Cure of Hernia, &c., by Heber Chase, M.D. 8vo. Philadelphia, 1837.

Surgical Observations on Tumors, with Cases and Operations, by John C. Warren, M.D. 8vo. Boston, 1837, and London, 1839. (Illustrated.)

Essay on Cataract, by Theodore Maunnoir, M.D. Geneva. Translated from the French, by Henry J. Bowditch, M.D. Boston, 8vo. 1838.

On the Application of the Ligature to Arteries or their Trunks, at a distance from the wounded part and nearer the heart, a Contribution to Traumatic Hemorrhages, by Charles J. Beck, M.D. Frieberg. Translated from the German, by Edward G. Davis, M.D. Philadelphia, 1838.

Practical Surgery, by Robert Liston, M.D., with Additional Notes and Illustrations, by George W. Norris, M.D. 8vo. Philadelphia, 1838, 1842.

Boylston Prize Dissertations (On Cancer of the Mammæ), by Usher Parsons, M.D. 8vo. Boston, 1839.

On the Enlisting, Discharging, and Pensioning of Soldiers, by Henry Marshall, F.R.S.E., with the Regulations for the Recruiting Service in the U. S. Army and Navy, with a Preface, by W. S. W. Ruschenberger, M.D. 8vo. Philadelphia, 1840.

A Treatise on the Diseases of the Breast, by Velpeau. Translated from the French, by S. Parkman, M.D. 8vo. Philadelphia, 1840.

Lectures on Retention of Urine caused by Stricture of the Urethra, and on the Diseases of the Prostate, by M. Amussat. Translated by J. P. Jervcy, M.D. (Charleston). 8vo. Philadelphia, 1840.

Memoir on the Radical Cure of Club-Foot, by H. Scoutetten, M.D. Translated by F. Campbell Stewart, M.D. 8vo. Philadelphia, 1840.

On the Medical and Prophylactic Treatment of Stone and Gravel, with a Memoir on the Calculi of Cystine, by Civiale, D. M. P. Translated from the French, by Henry H. Smith, M.D. 8vo. Philadelphia, 1841.

Remarks on the Surgical Practice of Paris, illustrated by Cases (Thesis), by W. D. Markham, M.D. 8vo. Philadelphia, 1841.

Practical Surgery, by Robert Liston, Surgeon. 2d American from 3d London edition, with Additional Notes and Illustrations, by George W. Norris, M.D. 8vo. Philadelphia, 1842.

Elements of Surgery, by Robert Liston, with Copious Notes and Additions, by Samuel D. Gross, M. D. 8vo. Philadelphia, 1842 and 1846.

Minor Surgery, or Hints on the Everyday Duties of the Surgeon, by Henry H. Smith, M. D. 12mo. Philadelphia, 1843, 1846, and 1850.

A Practical Treatise on the Diseases of the Testis and of the Spermatic Cord and Scrotum, by T. B. Curling. Edited by Paul B. Goddard, M. D. 8vo. Philadelphia, 1843.

A System of Practical Surgery, by William Fergusson, F.R.S., with Notes and Additional Illustrations, by Geo. W. Norris, M. D. 8vo. Philadelphia, 1843. The same, 4th edition, 1853.

A Treatise on the Diseases of the Eye, by W. Lawrence, F.R.S. Edited, with numerous Additions, by Isaac Hays, M. D. 8vo. Philadelphia, 1843, 1847, and 1854.

New Elements of Operative Surgery, by Velpeau. Translated from the French, by P. S. Townsend, M. D. Augmented by the addition of several hundred pages of entirely new matter, comprising all the latest improvements, and discoveries in Surgery, in America and in Europe, up to the present time, under the supervision of, and with notes by Valentine Mott, M. D. 3 vols. grand 8vo. New York, 1844.

The Principles and Practice of Modern Surgery, by Robert Druitt, Surgeon. Edited, with notes and comments, by Joshua B. Flint, M. D. 8vo. Philadelphia, 1844.

The same, edited by F. W. Sargent, M. D. 1848.

A Treatise on Operative Surgery, comprising a Description of the various Processes of the Art, including all the new Operations (with lithographic plates), by Joseph Pancoast, M. D. 4to. Philadelphia, 1844.

The same, 3d edition, revised and enlarged. Philadelphia, 1852.

Manual of Orthopædic Surgery, being a Dissertation which obtained the Boylston Prize for 1844, on the question, "To what extent is the division of muscles, tendons, or other parts proper for the relief of deformities or lameness?" by Henry J. Bigelow, M. D. 8vo. Boston, 1845.

American Medical Biography, or Memoirs of Eminent Physicians (and Surgeons), embracing those principally who have died since the publication of Dr. Thacher's work on the same subject, by Stephen W. Williams, M. D. Greenfield, Mass., 1845.

Lectures on the Operations of Surgery, and on the Diseases and Accidents requiring Operations, by Robert Liston, F.R.S., with numerous Additions, by Thomas D. Mütter, M.D. 8vo. Philadelphia, 1846.

A System of Surgery, by J. N. Chelius. Translated from the German, and accompanied with Additional Notes and Observations, by John F. South (with additional references to the Surgical Literature of the United States, by G. W. Norris, M.D.). 8vo. Philadelphia, 1847.

On Bandaging and other Operations of Minor Surgery, by F. W. Sargent, M.D. 12mo. Philadelphia, 1847.

The Principles and Practice of Surgery, by George McClellan, M.D. Edited by his son, John H. B. McClellan, M.D. 8vo. Philadelphia, 1848.

On Etherization with Surgical Remarks, by John C. Warren, M.D. 12mo. Boston, 1848.

Effects of Chloroform and of strong Chloric Ether as narcotic agents (with statistics, post-mortem examinations, &c.), by John C. Warren, M.D. Boston, 1849.

The Practice of Surgery, embracing Minor Surgery, by John Hastings, M.D. 12mo. Philadelphia, 1850.

On the Physiological Effects of Sulphuric Ether, and its Superiority to Chloroform, by Wm. T. G. Morton, M.D. 8vo. Boston, 1850.

A Practical Treatise on the Diseases and Injuries of the Urinary Bladder, the Prostate Gland, and the Urethra, by S. D. Gross, M.D. 8vo. Philadelphia, 1851.

The Principles and Practice of Surgery, by Wm. Pirrie, Surgeon. Edited with Additions, by Jno. Neill, M.D. 8vo. Philadelphia, 1852.

The Principles of Surgery, by Jas. Miller, 3d American from the 2d and enlarged Edinburgh edition. Revised with Additions, by F. W. Sargent, M.D. 8vo. Philadelphia, 1852.

Illustrated Manual of Operative Surgery and Surgical Anatomy, by MM. C. Bernard and C. Huette, D.M.P. Edited with Notes and Additions, &c., by Wm. H. Van Buren, M.D., and C. E. Isaacs, M.D. 8vo. (with beautiful plates), New York, 1852 (2 parts).

On the Surgical Treatment of Polypi of the Larynx and Edema of the Glottis, by Horace Green, M.D. 8vo. New York, 1852.

Hydatids of the Liver, Operation and Cure, by J. M. Weber, M.D. 8vo. New York, 1852.

Report of a Committee appointed by the American Medical Association on the Permanent Cure of Reducible Hernia, by George Hayward, M.D., Chairman, &c. 8vo. 1852.

Operative Surgery, illustrated, with explanatory text, by R. U. Piper, M.D. 8vo. Boston, 1852.

History of Kentucky Surgery, read before the Kentucky State Medical Society, at its annual meeting at Louisville, by Samuel D. Gross, M.D. 8vo. 1853.

A Treatise on Operative Ophthalmic Surgery, by H. Haynes Walton, Surgeon, first American from the first London edition. Edited by S. Littell, M.D. 8vo. Philadelphia, 1853.

The Practice of Surgery, by Jas. Miller, 3d American from the 2d Edinburgh edition. Edited with Additions, by F. W. Sargent, M.D. 8vo. Philadelphia, 1853.

The Surgical Treatment of Fibrous Tumors of the Uterus, heretofore considered beyond the resources of art, by Washington L. Atlee, M.D., Philadelphia (Prize Essay of the American Medical Association). 8vo. 1853.

Practical Observations on Aural Surgery, and the Nature and Treatment of Diseases of the Ear, with Illustrations, by Wm. R. Wilde. Edited by Addinell Hewson, M.D. 8vo. Philadelphia, 1853.

AMERICAN MEDICAL JOURNALS

FROM THE YEAR 1785 TO 1854.

The following list includes only such Journals as were accessible, and contained Surgical papers. Although it exhibits very many of the medical journals of this country, it is probable that it does not include all; editorial changes, and the irregular distribution of some of them, rendering it difficult for any individual to obtain accurate information respecting them, especially in relation to the western journals. The matter in parenthesis () is introduced as explanatory of the paper, and will not always be found in the original title.

Memoirs of the American Academy of Arts and Sciences. 4to. Boston, 1785—1793.

Medical Papers, Communications and Dissertations, communicated to the Massachusetts Medical Society. To which are subjoined,

extracts from various authors, containing some of the improvements which have lately been made in Physic and Surgery. Published by the Society, in 2 vols. 8vo. Boston, 1790—1813.

Transactions of the College of Physicians, of Philadelphia. 8vo. Philadelphia, 1793—1850.

The Medical Repository of Original Essays and Intelligence relative to Physic, Surgery, Chemistry, and Natural History; with a critical Analysis of recent publications on these departments of knowledge, and their auxiliary branches. 8vo. New York, 1797—1821. This was the first medical journal published in the United States, though the Transactions of the American Academy of Arts and Sciences, of the Massachusetts Medical Society, and of the College of Physicians, Philadelphia, which preceded it, published medical cases in connection with their proceedings.

The Philadelphia Medical and Physical Journal. Collected and arranged by Benjamin Smith Barton, M. D. 8vo. Philadelphia, 1804—1805.

The Philadelphia Medical Museum, conducted by John Redman Coxe, M. D. 8vo. Philadelphia, 1805—1811.

The Medical and Agricultural Register for the years 1806, 1807, by Daniel Adams, M. D. 8vo. Boston.

The Baltimore Medical and Physical Recorder, conducted by Tobias Watkins, M. D. 8vo. Baltimore, 1809.

The New York Medical and Philosophical Journal and Review. 8vo. New York, 1809—1811.

The American Medical and Philosophical Register; or Annals of Medicine, Natural History, Agriculture, and the Arts. Conducted by a Society of Gentlemen. 8vo. New York, 1811—1814.

The Eclectic Repertory and Analytical Review, Medical and Philosophical. Edited by a Society of Physicians. 8vo. Philadelphia, 1811—1820.

The New England Journal of Medicine and Surgery, and the collateral branches of Science. Conducted by a number of Physicians. 8vo. Boston, 1812—1827.

Transactions of the Physico-medical Society of New York. 8vo. New York, 1817.

The Medical and Surgical Register; consisting chiefly of Cases in the New York Hospital. By John Watts, Jr., M. D., Valentine Mott, M. D., and Alexander H. Stevens, M. D. 8vo. N. York, 1818.

The American Medical Recorder. Conducted by several respectable Physicians of Philadelphia. 8vo. Philadelphia, 1818, 1829.

The Philadelphia Journal of the Medical and Physical Sciences. Supported by an Association of Physicians, and edited by N. Chapman, M. D. 8vo. Philadelphia, 1820—1827.

The Journal of Foreign Medical Science and Literature, being a continuation of the Eclectic Repertory. Conducted by Samuel Emlen, M. D., William Price, M. D., and John D. Godman, M. D. 8vo. Philadelphia, 1821—1824.

The New York Medical and Physical Journal. Edited by John W. Francis, M. D., Jacob Dyckman, M. D., and John B. Beck, M. D. 8vo. New York, 1822—1829.

The Philadelphia Journal of the Medical and Physical Sciences. New Series. Edited by N. Chapman, M. D., and William P. Dewees, M. D. 8vo. Philadelphia, 1825—1827.

The North American Medical and Surgical Journal. Conducted by Hugh L. Hodge, M. D., Franklin Bache, M. D., Charles D. Meigs, M. D., B. H. Coates, M. D., and René La Roche, M. D. 8vo. Philadelphia, 1826—1831.

The American Journal of the Medical Sciences. Edited by Isaac Hays, M. D. 8vo. Philadelphia, 1827—1854. This journal contains the largest number of valuable papers of any Journal in the U. States.

The Boston Medical and Surgical Journal. (Published weekly.) 8vo. Boston, 1828—1850.

The Transylvania Journal of Medicine, and the Associate Sciences. Edited by John Esten Cooke, M. D., and Charles W. Short, M. D. Lexington, Ky., 1828—1837.

The same, edited by Ethelbert L. Dudley, M. D., and H. M. Bullitt, M. D. 1850.

The same, edited by L. J. Frazee, M. D. Louisville, 1853.

The Monthly Journal of Foreign Medicine. Conducted by Squire Littell, Jr., M. D. Philadelphia, 1828, 1829.

The New York Medical and Physical Journal. New Series. Conducted by Daniel L. M. Peixotto, M. D. 8vo. New York, 1829—1831.

The Maryland Medical Recorder. Conducted by Horatio G. Jameson, M. D. Baltimore, 1829—1832.

The New York Medical Inquirer and the American Lancet (late

Medical Inquirer), by an Association of Physicians and Surgeons. New York, 1830.

New York Médico-Chirurgical Bulletin. Edited by George Bushe, M. D. New York, 1831, 1832.

The Baltimore Medical and Surgical Journal and Review. Edited by E. Geddings, M. D. Baltimore, 1833—1835.

The Medical Magazine. Conducted by A. L. Pierson, M. D., J. B. Flint, M. D., and E. Bartlett, M. D. Boston, 1833—1835.

The American Lancet. Edited by F. S. Beattie, M. D. Philadelphia, 1833.

Southern Medical and Surgical Journal. Edited by Paul F. Eve, M. D. Augusta, Georgia, 1836.

The United States Medical and Surgical Journal. Conducted by a number of respectable Physicians in various parts of the United States. New York, 1834—1837.

The same. Edited by L. A. Dugas, M. D. Augusta, Georgia, 1853.

Bulletin of Medical Science. Edited by John Bell, M. D. Philadelphia, 1837.

The American Medical Intelligencer. Edited by Robley Dunglison, M. D. (Containing reprints, translations, &c., of many excellent works.) Philadelphia, 1837—1842.

Medical Examiner and Record of Medical Science. Edited by M. Clymer, M. D., and J. B. Biddle, M. D. Philadelphia, 1837.

The same. Edited by F. G. Smith, M. D., and J. B. Biddle, M. D. Philadelphia, 1850.

New York Journal of Medicine and Surgery. Edited by S. Forry, M. D. New York, 1839—1841.

New Orleans Medical and Surgical Journal. Edited by A. Hester, M. D. New Orleans, 1844.

Illinois Medical and Surgical Journal. Chicago, 1844.

Buffalo Medical and Surgical Journal. Edited by Austin Flint, M. D. 1845.

New York Medical Gazette. Edited by D. M. Reese, M. D., LL. D. New York, 1849.

New York Journal of Medicine and Collateral Sciences. Edited by S. S. Purple, M. D. New York, 1849.

St. Louis Medical and Surgical Journal. Edited by Drs. Linton, Moore, McPheeters, and Jos. N. McDowell. 1849.

The Charleston Medical Journal and Review. Edited by P. C. Gaillard, M. D., and H. W. De Saussure, M. D. Charleston, 1849.

The Western Lancet and Hospital Reporter. Edited by L. M. Lawson, M. D., and John P. Harrison, M. D. Cincinnati, Ohio, 1849.

New York Register of Medicine and Pharmacy. Edited by C. D. Griswold, M. D. New York, 1850.

The Ohio Medical and Surgical Journal. Edited by S. Hanbury Smith, M. D. Columbus, Ohio, 1850.

The same. Edited by Richard L. Howard, M. D. Columbus, Ohio, 1853.

The New Jersey Medical Reporter, and Transactions of the New Jersey Medical Society. Edited by Joseph Parrish, M. D. Burlington, N. J., 1850.

Western Journal of Medicine and Surgery. Edited by Lunsford P. Yandell, M. D. Louisville, 1850.

The Stethoscope and Virginia Medical Gazette. Edited by P. Claiborne Gooch, A. M., M. D. Richmond, Va., 1851.

The North-Western Medical and Surgical Journal. Edited by W. B. Herrick, M. D., assisted by H. A. Johnson, M. D. Chicago, 1852.

The New York Medical Times. Edited by Henry D. Bulkley, M. D. New York, 1852.

Nashville Journal of Medicine and Surgery. Edited by W. R. Bowling, M. D., and Paul F. Eve, M. D. Nashville, Tenn., 1852.

The New Orleans Monthly Medical Register. By A. Forster Axson, M. D. New Orleans, 1852.

The New Orleans Medical and Surgical Journal, devoted to Medicine and the Collateral Sciences. Edited by A. Hiester, M. D. New Orleans, 1852.

American Lancet and Monthly Journal of Practical Medicine. Edited by Horace Nelson, M. D. Plattsburg, N. Y., 1853.

The New Hampshire Journal of Medicine. Edited by Edward H. Parker, A. M., M. D. Concord, N. H., 1853.

The East Tennessee Record of Medicine and Surgery. Edited by Frank A. Ramsay, A. M., M. D. Knoxville, Tenn., 1853.

The Virginia Medical and Surgical Journal. Edited by George A. Otis, M. D., and Howell L. Thomas, M. D. Richmond, Va., 1853.

Southern Journal of Medical and Physical Sciences. Edited by Drs. King, Jones, Ramsey, Currey, Wood, Atchison, and Scruggs. Nashville, 1853.

American Lancet and Monthly Journal of Practical Medicine.
Edited by Horace Nelson, M. D. Plattsburg, N. Y., 1853.

Peninsular Journal of Medicine and Collateral Sciences. Edited
by E. Andrews, A. M., M. D. Ann Arbor, Michigan, 1853.

Kentucky Medical Recorder. Edited by H. M. Bullett, M. D.,
and R. J. Breckenridge, M. D. New Series, Louisville, Ky., 1853.

INDEX OF SPECIAL PAPERS

PUBLISHED BY

AMERICAN SURGEONS FROM THE YEAR 1783 TO THE YEAR 1854.

THE papers included in the following index exhibit, it is thought, a fair statement of those published by American surgeons since the year 1783. It has been composed with great care and with much labor, in the hope of enabling the reader to form a correct estimate of the published acts of such surgeons as have aided in illustrating the surgical practice of the United States. Its deficiencies may doubtless be noticed, but they must be ascribed mainly to the fact that the circulation of many of the journals has either been limited to certain States, or that they have been imperfectly preserved both in our public and private libraries. The revision of this list for the present edition has, however, satisfied the author that the number of papers that have been omitted must bear a very small ratio to those that are reported; and the index is, therefore, presented with considerable confidence in the belief that it is as complete as is possible for so long a period as the term of seventy years, the period which it now represents. The matter in () is not in the original title, but is added as indicating points of interest, and as explanatory of the case.

PART I.

PAPERS ON THE ELEMENTARY OPERATIONS, ETC.

Experiments on the Coagulation of Blood when out of the Body (showing that the air is a strong coagulant of blood, and that it is not owing to cold), by Thomas Hewson, M. D. Philadelphia.

Eclectic Repertory, vol. i. p. 230, 1811.

On the employment of Animal Ligatures, by Philip Syng Physic, M. D. Philadelphia.

Eclectic Repertory, vol. vi. p. 389, 1816.

Observations on Traumatic Hemorrhage, illustrated by Experiments on living Animals, by Horace G. Jameson, M.D. Baltimore.
American Med. Recorder, vol. xi. p. 3, 1827.

On the Use of the Bandage (to arrest hemorrhage and supersede the use of the knife and saw), in Gunshot Wounds, Fractures, &c., by Benjamin Winslow Dudley, M.D. Lexington.

Transylvania Journ. of Medicine, vol. i. p. 501, 1828.

Utility of the Bandage in Wounds of the Arteries, by N. Gaither, M.D. Kentucky.

Transylvania Journ. of Medicine, vol. ii. p. 143, 1829.

Experiments on the Use of Metallic Ligatures as applied to Arteries, by Henry S. Levert, M.D. Mobile, Ala.

Am. Journ. Med. Sciences, vol. iv. p. 17, 1829.

Aneurism of the Brachial Artery, cured by Compression, by J. W. Heustis, M.D. Cahawba, Ala.

Am. Journ. Med. Sciences, vol. ix. p. 261, 1831.

Torsion of Arteries (practised in Dec. 1826, in presence of Surgeons Rogers and Ford, British army; three years before Ámussat), by George Bushe, M.D. New York.

N. Y. Medico-Chirurgical Bulletin, vol. ii. p. 212, 1832.

Two Cases of Accidents from admission of Air into the Veins during Surgical Operations, by John C. Warren, M.D. Boston.

Am. Journ. Med. Sciences, vol. x. p. 545, 1832.

Also, article Air, by J. C. Warren, M.D. Boston.

Amer. Cyclopedia of Practical Medicine and Surgery, vol. i. p. 263, 1834.

Entrance of Air into the Vein whilst ligating the Subclavian Artery (recovery), by R. D. Mussey, M.D. Fairfield, New York.

Am. Journ. Med. Sciences, vol. xxi. p. 377, 1837.

Report of five cases of Wounds of Arteries, treated by Compression, by T. S. Kirkbride, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxiii. p. 324, 1839.

Wounds of Arteries, successfully treated by Compression, by George Thompson, M.D. Tennessee.

Am. Journ. Med. Sciences, vol. iii. N. S. p. 262, 1842.

On the Use of Sutures in Surgery, and their Advantages over Adhesive Strips, and other modes of Coaptation of the Edges of Wounds, by W. T. Wragg, M.D.

Charleston Med. Journ., vol. iii. p. 633, 1848.

On Collodion, or new Liquid Adhesive Plaster, by John P. Maynard. Boston.

Am. Journ. Med. Sciences, vol. xv. N. S. p. 577, 1848.

On the Advantages of Simple Dressings in Surgery, by E. R. Squibb, M. D., U.S. Navy.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 17, 1849.

On Cold Water as a Surgical Dressing, by J. C. Warren, M. D. Boston.

Address of Dr. Warren before Am. Med. Association at Cincinnati, 1850.

ON ETHERIZATION.

Inhalation of Ethereal Vapor, for the prevention of Pain in Surgical Operations (being the first cases in which it was used), by John C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxxv. p. 375, 1846, and *Am. Journ. Med. Sciences*, vol. xiii. p. 260, 1847.

Inhalation of Ether, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xiii. N. S. p. 522, 1847.

On Anæsthetic Agents, with Statistics from various Hospitals in the United States, by Drs. Isaac Parrish, and Henry J. Bigelow.

Transactions Am. Med. Association, vol. i. p. 174, *et seq.*, 1848.

Report of Operations performed under Anæsthetic Agents, by Paul F. Eve, M. D. Georgia.

Southern Med. and Surg. Journ., vol. v. p. 278, 1849.

On Anæsthetics, (see Report of Committee on Surgery, American Medical Association.)

Transactions Am. Med. Association, vol. ii. p. 211, 1849.

On Anæsthesia, by R. D. Mussey, M. D., Cincinnati, Chairman of the Committee on Surgery, American Medical Association.

Transactions Am. Med. Association, vol. iii. p. 321, 1850.

Ether and Chloroform, by John C. Warren, M. D. Boston.

Address, by Dr. Warren, before Am. Med. Ass. at Cincinnati, Boston, 1850.

On the Use of Anæsthetics, by J. C. Warren, M. D. Boston.

Transactions Am. Med. Association, vol. iii. p. 385, 1850.

The Influence of Chloroform in increasing Hemorrhage after Amputation, by Kirtley Ryland, M. D. St. Louis, Mo.

St. Louis Med. and Surg. Journ., vol. xi. p. 208, 1853.

Clinical Remarks on a Case of Death from Chloroform, accidentally administered (inhaled) in the Massachusetts General Hospital, by J. C. Warren, M. D. Boston.

New York Journ. Med., vol. x. N. S. p. 121, 1853 ;
also *Boston Med. and Surg. Journ.*, vol. xlvii. p. 353, 1852.

On the Test for the Safety-Point of Anæsthesia, by James Bolton, M. D. Richmond.

Stethoscope and Virginia Med. Gazette, vol. ii. p. 681, 1852.

On Anæsthetic Agents, by Charles T. Jackson, M. D. Boston.

Southern Med. and Surg. Journ., vol. ix. N. S. p. 5, 1853.

Remarks on Chloroform, by Samuel A. Cartwright, M. D. New Orleans.

Boston Med. and Surg. Journ., vol. xlvii. p. 254, 1852.

Remarks on the Comparative Value of the Different Anæsthetic Agents, by George Hayward, M. D. Boston.

Western Lancet, vol. xi. p. 375, 1850, from *Boston Med. and Surg. Journ.*

Remarks on the Importance of Anæsthesia from Chloroform in Surgical Operations, Illustrated by two Cases, by Valentine Mott, M. D. New York.

N. Y. Journ. Med., vol. vii. p. 9, 1851, from *Trans. N. Y. Acad. Med.*

Report of the Committee of the Medical Society of Virginia on the Utility and Safety of Anæsthetic Agents (a valuable and extended Report), by Drs. Bolton, Gibson, Cunningham, and Parker.

Stethoscope, vol. i. p. 181, 1851.

Non-Fatal Accidents from Anæsthetic Agents, with Observations, by Wm. H. Mussey, M. D. Cincinnati.

Western Lancet, Nov. 1853.

PART II.

PAPERS RELATING TO OPERATIONS ON THE HEAD AND FACE.

ON ANASTOMOSING ANEURISM AND NÆVUS MATERNUS.

Case of Aneurism by Anastomosis on the Scalp, in which both primitive Carotid arteries were tied (and the Tumor dissected out successfully), by R. D. Mussey, M. D. New Hampshire.

Am. Journ. Med. Sciences, vol. v. p. 316, 1829.

Ligature of the Carotid for Anastomosing Aneurism (of the face) in a Child three months old (cured), by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. vii. p. 271, 1830.

Case of Nævus Maternus terminating in Aneurism by Anastomosis, cured by an Operation (extirpation), by Horatio G. Jameson, M. D.

Maryland Med. Record, vol. ii. p. 105, 1831.

Telangiectasis, being a Report of Cases treated (by white-hot needles, ligature, &c.,) by George Bushe, M. D. New York.

N. Y. Medico-Chirurgical Bulletin, vol. i. p. 49, 1832.

Observations on the Nature and Treatment of Telangiectasis, or that morbid state of the Bloodvessels which gives rise to Nævus and Aneurism from Anastomosis, by John Watson, M. D. New York.

Am. Journ. Med. Sciences, vol. xxiv. p. 24, 1839.

Treatment of Vascular Nævus by Caustic Threads, by N. R. Smith, M. D. Baltimore.

Am. Journ. Med. Sciences, vol. vi. N. S. p. 260, 1843.

Nævi Materni, treated by needles and ligature, by George Hayward, M. D. Boston.

Boston Med. and Surg. Journ., vol. xix. p. 157, 1838.

Ligature of both Carotids for a remarkable Erectile Tumor of

the Mouth, Face, and Neck (cured), by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 281, 1846.

Erectile Tumor of the Face, successful ligature of the Primitive Carotid, use of thirty needles heated to a red heat (relieved), by James D. Trask, M. D. White Plains, New York.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 86, 1849.

On the Use of Collodion in the Cure of Erectile Tumors, without Operation, by Daniel Brainard, M. D., Chicago.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 515, 1849.

Two Cases of Morbid Erectile Tissue, treated successfully by heated needles, by J. W. Schmidt, M. D. New York.

N. Y. Journ. of Medicine, vol. iv. N. S. p. 66, 1850.

ON TUMORS AND OTHER DISEASES OF THE HEAD.

Two Cases of Tumors on the Head of New-Born Children (Cephalæmatoma), treated by Puncture, successfully, by R. N. Allen, M. D. Maryland.

Maryland Med. Record, vol. iii. p. 257, 1832.

Case of Extraordinary Tumor attached to the Occipital Region of the Head (length $24\frac{1}{2}$ inches), communicating with the Cavity of the Cranium, by E. S. Bennet, M. D. Charleston.

Baltimore Med. and Surg. Journ., vol. i. p. 351, 1833.

Observations on Sanguineous Tumors of the Head, which form spontaneously; sometimes denominated Cephalæmatoma and Abscessus Capitis Sanguineus Neonatorum, by E. Geddings, M. D. Baltimore.

North American Archives, vol. ii. p. 217, 1835.

Exostosis of the Frontal Bone removed, by R. D. Mussey, M. D. New Hampshire.

Am. Journ. Med. Sciences, vol. xxi. p. 377, 1837.

On Extirpation of Encysted and other Tumors, by Alexander H. Stevens, M. D. New York.

Boston Med. and Surg. Journ., vol. xxii. p. 53, 1840.

Operation for the removal of a large bony Tumor, called Spina Ventosa, by George McClellan, M. D. Philadelphia.

Medical Examiner, vol. iv. p. 44, 1841.

Anaplastic Operation for removal of a Deformity caused by a hole

in the forehead, left by Syphilitic Necrosis of the whole external table of the Os Frontis, by John Watson, M. D. New York.

Am. Journ. Med. Sciences, vol. viii. N. S. p. 537, 1844.

Report of two Cases of Cephalæmatoma, with some Remarks on Diagnosis and Treatment, by Lewis Shanks, M. D. Tennessee.

Ohio Med. and Surg. Journ., vol. ii. p. 537, 1850.

ON HYDROCEPHALUS.

Case of Hydrocephalus tapped, by P. S. Physick, M. D. Philadelphia, 1801.

Philadelphia Journ. Med. and Phys. Sciences, vol. iv. p. 316, 1826.

Case of Congenital Hydrocephalus, forming a cyst on the back of the head, containing the posterior lobes of the cerebrum, in which the water was evacuated by puncturing the brain (died), by Wm. E. Horner, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. iv. p. 530, 1829.

Case of Hydrocephalus treated by tapping (operation performed seven times, and sixty-one ounces of fluid drawn off; patient lived near two months after the first tapping), by L. A. Dugas, M. D. Georgia.

Am. Journ. Med. Sciences, vol. xx. p. 536, 1837.

Case of Hydrocephalus (repeatedly tapped—died), by J. B. Whitridge, M. D. Charleston.

Am. Journ. Med. Sciences, vol. xx. p. 538, 1837.

Account of an accumulation of eight ounces of fluid between the Cranium and the Scalp, by Robert Lebby, M. D.

Am. Journ. Med. Sciences, vol. xvi. p. 250, 1835.

Operation of Paracentesis Capitis (relieved) in a case of Hydrocephalus, by M. Howard, M. D. Louisville.

Transylvania Med. Journ., vol. iii. p. 373, 1852.

Case of Hydrocephalus (tapped—died), with Remarks on Nature and Treatment of this Disease, by H. L. Byrd, M. D. Savannah, Georgia.

Charleston Med. and Surg. Journ., vol. viii., p. 774, 1852.

ON TREPHINING AND INJURIES OF THE HEAD.

Fracture of the Skull and Wound of the Brain (cured after the application of the Trephine), by John Syng Dorsey, M. D. Philadelphia.

Philadelphia Med. Museum, vol. ii. p. 282, 1806.

Memoir on the Subsequent Treatment of Injuries of the Head, illustrated by Cases, by Valentine Mott, M.D. New York.

Transactions of the Physico-Med. Society of New York, vol. i. p. 223, 1817.

Fungus Cerebri, successfully treated by Excision, by Jonathan A. Allen, M.D. Brattleboro' Vermont.

New England Med. Journ., vol. viii. p. 323, 1819.

Fractured Skull, successfully Trephined, by Andrew Park, M.D. Eaton, Georgia.

Philadelphia Journ. of Med. and Phys. Sciences, vol. viii. 1824.

Epilepsy from Depressed Bone, cured by Trephining, by David L. Rogers, M.D. New York.

N. Y. Med. and Phys. Journ., vol. v. p. 79, 1826.

Observations on Injuries of the Head, by Benjamin W. Dudley, M.D. Lexington.

Transylvania Journ. of Med., vol. i. p. 9, 1828.

Case of Epilepsy cured by Trephining, by James Guild, M.D. Alabama.

Am. Journ. Med. Sciences, vol. iv. p. 96, 1829.

Chronic Injuries of the Brain relieved by an Operation with the Trephine, by William Judkins, M.D. Mount Pleasant, Ohio.

Transylvania Med. Journ., vol. ii. p. 135, 1829.

Case in which the Osseous Disk, removed by a Trephine, was regenerated.

Maryland Med. Recorder, vol. i. p. 152, 1829.

Case of Hernia Cerebri, cured by Sponge Compress, by J. W. Heustis, M.D. Mobile.

Am. Journ. Med. Sciences, vol. iii. p. 349, 1829.

A Case of Depressed Fracture of the Cranium, successfully treated without resorting to the Trephine, by Thomas F. Dale, M.D. Pittsburg.

North American Med. and Surg. Journ., vol. x. p. 164, 1830.

Report of Cases of Injuries of the Head, treated in the Pennsylvania Hospital, by George W. Norris, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. ix. p. 304, 1831.

Use of the Trephine in Epilepsy, being the sixth successful case, by Benjamin W. Dudley, M.D. Lexington, Kentucky.

Am. Journ. Med. Sciences, vol. xi. p. 542, 1832.

Compound Camerated Fracture of the Cranium, successfully treated by the removal of three pieces of the external table of the Skull, by Paul F. Eve, M.D. Georgia.

Am. Journ. Med. Sciences, vol. xii. p. 549, 1833.

Epilepsy successfully treated by Trephining, by George Hayward, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxii. p. 517, 1838.

Researches on Hernia Cerebri following Injuries of the Head. Essay, read before N. Y. Med. and Surg. Society, by Gurdon Buck, Jr., M. D. New York.

New York Journ. Med. and Surg., vol. iv. p. 348, 1840.

Cases of Injury of the Head, by A. B. Shipman, M. D. Cortland County, New York.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 66, 1841.

Cases of Injury of the Head, by A. B. Shipman, M. D.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 373, 1841.

Cases of Injury of the Head, by A. B. Shipman, M. D. Indiana.

Boston Med. and Surg. Journ., vol. xxxviii. pp. 353, 373, 1848.

Trephining for Epilepsy (of twenty years' standing), successful, by J. G. F. Holston, M. D. Ohio.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 541, 1849.

Compound Comminuted Fracture of Skull, removal of a large portion of the right Parietal Bone (Recovery), by George Fox, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 43, 1849.

Fracture of the Cranium with Depression; Epilepsy; Operation; Recovery, by Charles A. Pope, M. D. St. Louis.

St. Louis Med. and Surg. Journ., vol. vii. p. 298, 1850.

Trephining for an old Depression of the Cranium causing Idiocy (died on the ninth day from hemorrhage from longitudinal sinus), by J. M. Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xix. N. S. p. 72, 1850.

Surgical Treatment of Epilepsy (7 cases operated on by trephine, &c.), by John G. F. Holston, M. D. New Concord, Ohio.

Western Lancet, vol. xi. p. 700, 1850.

A Case of Epilepsy cured by Trephining the Skull, by E. L. Dudley, M. D. Lexington, Kentucky.

Transylvania Med. Journ., vol. i. N. S. p. 84, 1851.

Epilepsy (cured by dissecting cicatrices in scalp free from cranium), by F. H. Hamilton, M. D. Buffalo.

Western Lancet, vol. xi. p. 321, 1850, from *Buffalo Med. Journ.*

Abscess in the Substance of the Brain, Hernia Cerebri, the Lateral Ventricles opened by an Operation (died), by William Detmold, M. D. New York.

Am. Journ. Med. Sciences, vol. xix. N. S. p. 86, 1850.

Fracture of the Cranium; Depression; Epilepsy — trephined, cured, by Charles A. Pope, M. D. St. Louis.

St. Louis Med. and Surg. Journ., vol. vii. p. 293, 1850.

Injuries of Cranium—trepanning, by Henry F. Campbell, M. D. Augusta, Georgia.

Southern Med. and Surg. Journ., vol. vii. p. 279, 1851.

Report of Trephining for Compression of the Brain (cured), by J. W. H. Trugien, M. D. Portsmouth, Virginia.

Stethoscope, vol. i. p. 647, 1851.

Case of Fracture of the Cranium, with Depression, followed by Traumatic Tetanus, in which Trephining was successfully practised, by E. Geddings, M. D. Charleston.

Charleston Med. Journ., vol. vii. p. 505, 1852.

Trephining the Cranium and Ligature of the Carotid Artery in Epilepsy (but little relieved), by Willard Parker, M. D. New York.

New York Journ. Med., vol. viii. N. S. p. 418, 1852.

Remarks on Fracture of the Cranium (6 Cases showing Results of trephining) by John Harden, M. D. Louisville, Kentucky.

Western Journ. Med. and Surg., vol. ix. 3d series, p. 203, 1852.

The Surgical Treatment of Epilepsy, with Statistical Tables of all the recorded cases of Ligature of the Carotid Arteries, and also Trephining the Cranium, as performed by American Surgeons, by Stephen Smith, M. D. New York.

New York Journ. Med., vol. viii. p. 220, 1852.

A Description of, and Remarks upon a newly constructed Trephine (with a Cut), by Samuel S. Purple, M. D. New York.

New York Journ. Med., vol. x. N. S. p. 419, 1853.

ON AFFECTIONS OF THE EYELIDS.

Remarks on Encysted Tumors of the Eyelids, with a Case, by E. J. Davenport, M. D. Boston.

Boston Med. and Surg. Journ., vol. xviii. p. 413, 1838.

Case of Irritation of Tarsi Cartilages, caused by Pediculus Pubis, by J. D. Godman, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. i. p. 241, 1827.

Encysted Tumor of the Orbit of the Eye removed, by H. G. Jameson, M. D. Baltimore.

Philadelphia Med. Recorder, vol. xii. p. 340, 1827.

Observations on Entropion, with a Case, by Samuel Jackson, M. D. Northumberland, Pennsylvania.

Am. Journ. Med. Sciences, vol. iv. p. 297, 1829.

Scirrhus of the Lachrymal Gland, successfully removed, by George Bushe, M. D. New York.

Medico-Chirurgical Bulletin, vol. i. p. 38, 1832.

Dissertation on Fistula Lachrymalis, by Robert W. Haxall, M. D. Richmond, Virginia. (Boylston Prize Essay.)

Medical Magazine, Boston, vol. i. p. 129, 1832.

On Anchylo-blepharon, by Isaac Hays, M. D. Philadelphia.

Am. Cyclopædia of Practical Med. and Surg., vol. i. p. 464, 1834.

Blepharo-plastic Operations for Restoration of the Lower Eyelid, by J. Mason Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxiv. p. 149, 1841.

Case of Congenital Hypertrophy of the Upper Eyelids and Mucous Membrane of the Upper Lip, with an Inversion of the Eyelashes, by H. H. Toland, M. D. Columbia, South Carolina.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 244, 1841.

Blepharo-plastic Operation for Ectropion, by A. C. Post, M. D. New York.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 258, 1842.

Plastic Operation for Ectropion, by Daniel Brainard, M. D. Chicago.

Am. Journ. Med. Sciences, vol. x. N. S. p. 356, 1845.

Congenital Inability to raise the upper Eyelid, cured by Operation, by Charles A. Hall, M. D. Vermont.

Am. Journ. Med. Sciences, vol. xii. p. 143, 1846.

Symblepharon, successfully treated by a Plastic Operation, by Isaac Hays, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xiv. p. 263, 1847.

Carcinoma of the Eyelid—Blepharoplasty after Dieffenbach's Method, by C. Theodore Meier, M. D. New York.

New York Journ. Med., vol. ix. N. S. p. 205, 1852.

Case of Carcinoma Oculi and Extirpation of the Eyeball, by Henry W. Williams, M. D. Boston.

Boston Med. and Surg. Journ., vol. xlvii. p. 202, 1852.

Case of Fungus Hæmatodes of the Eye—Extirpation, by Edward Delafield, M. D. New York.

New York Journ. Med., vol. v. N. S. p. 199, 1850.

OPERATIONS ON THE EYEBALL.

Observations on Cataract and the various Modes of Operating for its Cure, by G. Fricke, M.D. Baltimore.

Medical Recorder, vol. iv. p. 26, 1821.

Artificial Pupil and Modes of Operating, by G. Fricke, M.D. Baltimore.

Medical Recorder, vol. vi. p. 36, 1822.

Artificial Pupil, by Edward Delafield, M.D. New York.

New York Med. Phys. Journ., vol. iv. p. 145, 1825.

An Account of a new Instrument for making Artificial Pupil and cutting up the Lens, by John Hill, M.D. South Carolina.

New York Med. Phys. Journ., vol. iv. p. 490, 1825.

Case of Wart on the Adnata, removed by Nitrate of Silver, by P. S. Physick, M.D. Philadelphia.

Philadelphia Med. Journ., vol. v. N. S. p. 187, 1827.

Extirpation of a Cancerous Eye, by Harvey Lindsly, M.D. Washington, District of Columbia.

Am. Journ. Med. Sciences, vol. vi. p. 349, 1830.

Operation for Formation of Artificial Pupil, by E. J. Davenport, M.D. Boston.

Boston Med. and Surg. Journ., vol. xix. p. 165, 1839.

Extraction of Foreign Bodies from the Eye, by Isaac Hays, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxiv. p. 514, 1839.

Case of Osseous Formation in the Eye, by J. Jeffries, M.D. Boston.

Boston Med. and Surg. Journ., vol. xxiii. p. 302, 1841.

Cases of Strabismus (division of the internal Rectus), reported by J. H. Dix, M.D. Boston.

Boston Med. and Surg. Journ., vol. xxiii. p. 265, 1841.

Cases of Operations for Artificial Pupil, by John Jeffries, M.D. Boston.

Boston Med. and Surg. Journ., vol. xxv. p. 249, 1841.

On the Operation for the Cure of Strabismus, by Joseph Pancoast, M.D. Philadelphia.

Medical Examiner, vol. iv. p. 390, 1841.

Sub-conjunctival Method of Operating for Strabismus, by E. J. Davenport, M.D. Boston.

Boston Med. and Surg. Journ., vol. xxv. p. 89, 1841.

Case of Congenital Tumor of the Eyeball, by W. T. Taliaferro, M. D. Kentucky.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 88, 1841.

Operation for Artificial Pupil and subsequent section of the Rectus Superior, by J. Kearney Rogers, M. D. New York.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 248, 1842.

Operation for Artificial Pupil, by Isaac Hays, M. D. Philada.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 371, 1842.

Two Cases Malignant Ophthalmic Disease (Colloid Tumor of the Orbit and Melanosis of Globe), Geo. A. Bethune, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxxvi. p. 509, 1847.

Dislocation of the Crystalline Lens, from a Blow, by Francis West, M. D. Philadelphia.

Philadelphia Med. Examiner, vol. vi. p. 241, 1850.

Dislocation of the Crystalline Lens, beneath the Conjunctiva, extraction at the Inner Canthus, by Charles A. Pope, M. D. St. Louis.

St. Louis Med. and Surg. Journ., vol. vii. p. 289, 1850.

Extraction of Cataract (the patient being under the influence of ether), by H. W. Williams, M. D. Massachusetts.

Boston Med. and Surg. Journ., vol. xlix. p. 338, 1853.

OPERATIONS ON THE FACE.

Tic Douloureux (cured by dividing the Infra and Supra-orbital Nerves), by Dr. Jeremy Stimpson, M. D. Boston.

New England Journ. Med. and Surg., vol. vi. p. 14, 1817.

Case of Anastomosing Aneurism of the Internal Maxillary Artery, by Granville Sharp Patteson, M. D. Baltimore.

Philadelphia Med. Recorder, vol. v. p. 108, 1822.

Facial Neuralgia, cured by Acupuncturation, by J. Hunter Ewing, M. D.

North American Med. and Surg. Journ., Philad., vol. vi. p. 77, 1826.

Cases illustrative of Remedial Effects of Acupuncturation, by Franklin Bache, M. D. Philadelphia.

North American Med. and Surg. Journ., vol. i. p. 311, 1826.

Cases of Neuralgia, treated by division of the Nerves (Infra-orbital, Submaxillary, Portio Dura, and Supra-orbital), by John C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. i. p. 1, 1828.

Excision of the Submaxillary Nerve (for Tic Douloureux, cured), by John C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. i. p. 2, 1828.

Case of Anastomosing Aneurism of the External Maxillary (Temporal) Artery successfully treated by tying the Common Carotid, by David L. Rogers, M. D. New York.

Am. Journ. Med. Sciences, vol. xiii. p. 271, 1833.

On Acupuncturation, by Franklin Bache, M. D. Philada.

American Cyclopaedia of Practical Medicine and Surgery, vol. i. p. 200, 1834.

Rhino-plasty, Blepharo-plasty, and Cheilo-plasty, in the same patient, by F. H. Hamilton, M. D. Buffalo.

Buffalo Medical Journal, vol. iv. p. 549, 1849.

A Horn (seven inches long and five broad at the base) excised from the Face, by Frank H. Hamilton, M. D. Buffalo.

Buffalo Medical Journal, vol. vi. p. 13, 1850.

Tic Douloureux—Relief by removing a portion of the Infra-Maxillary Nerve by trepanning the Lower Jaw, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxv. N. S. p. 85, 1853.

Excision of a portion of Inferior Maxillary Nerve for Neuralgia, by S. Parkman, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxv. N. S. p. 95, 1853.

OPERATIONS ON THE EXTERNAL NOSE.

Rhino-plastic Operation (being the first successful Case in the United States), by J. Mason Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. xvi. p. 69, 1837.

Rhino-plastic Operation, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xx. p. 269, 1837.

Rhino-plastic Operation, by Thomas D. Mütter, M. D. Philada.

Am. Journ. Med. Sciences, vol. xxii. p. 61, 1838.

Rhino-plastic Operations, by J. Mason Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxii. p. 264, 1840.

Auto-plastic Operations, by J. Mason Warren, M. D. Boston.

Boston Med. Journ., vol. xxii. p. 263, 1840.

Taliacotian Operation, flap divided seventy-two hours after the Operation (successful two years afterwards), by J. Mason Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxviii. p. 69, 1843.

Rhino-plastic Operations, by J. Pancoast, M. D. Philada.

Operative Surgery, p. 345, 1844.

Rhino-plastic Operation (covering alæ of one side), by B. J. Raphael, M. D. Louisville, Kentucky.

Trans. Med. Journ., vol. i. N. S. p. 28, 1851.

Cases (Two) of Plastic Surgery (Rhinoplasty) successfully performed, by David Gilbert, M. D. Philadelphia.

Philadelphia Med. Examiner, vol. vii. N. S. p. 238, 1851.

Rhinoplastic Operation (Indian method successfully performed), by Joseph Pancoast, M. D. Philadelphia.

Medical Examiner, vol. viii. N. S. p. 341, 1852.

ON POLYPI.

Inquiry into the Pathology and Treatment of Polypous Tumors of the Nasal Fossæ, with Observations on other Tumors in various parts of the Body, by John Watson, M. D. New York.

Am. Journ. Med. Sciences, vol. iii. N. S. p. 325, 1842.

Case of Gelatinous Polypus, cured with *Sanguinaria Canadensis*, after Extraction had twice failed, by Lewis Shanks, M. D. Tennessee.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 368, 1842.

A Nasal Operation for the removal of a large Tumor, filling up the entire Nostril, and extending into the Pharynx, by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. v. N. S. p. 87, 1842.

Removal of a large Polypus from the Nose, through the Pharynx (by a tape), by Paul F. Eve, M. D. Georgia.

Southern Med. and Surg. Journ., vol. v. p. 466, 1849.

Malignant Polypus of the Nose; Ligature of the Common Carotid Artery; Death with Cerebral Symptoms, by William H. Van Buren, M. D. New York.

New York Journ. Med., vol. ii. N. S. p. 297, 1849.

Exostosis of Nasal Bones—successfully removed, by William E. Horner, M. D. Philadelphia.

Philadelphia Med. Examiner, vol. vii. N. S. p. 33, 1851.

OPERATIONS ON THE LIPS.

Case of Double Harelip, operated on by Isaac Cathrall, M. D. Philadelphia.

Med. Recorder, vol. ii. p. 372, 1819.

Double Hare-lip, with Fissure through the Hard and Soft Palate, by J. C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. i. p. 140, 1828.

Remarks on the Operation of Hare-lip, by Zadoc Howe, M. D., Massachusetts.

Am. Journ. Med. Sciences, vol. vii. p. 414, 1831.

On the Operation of Hare-lip (within the week two cases successfully treated), by A. L. Peirson, M. D. Massachusetts.

Transylvania Journ. Med., vol. ix. p. 780, 1836.

Also, *Boston Med. and Surg. Journ.*, vol. xv. p. 293, 1836.

Two Cases of Congenital Division of the Lip and Palate, occurring in the same Family, in which Operations were performed, by Isaac Parrish, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxii. p. 97, 1838.

Case of Congenital Double Hare-Lip, with both Fissures extending through the Roof of the Mouth and Palate, by N. S. Davis, M. D. New York.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 371, 1841.

Three Cases of Hare-lip, in one of which the Operation resulted in Death. Reported by F. H. Hamilton, M. D. Buffalo.

Buffalo Med. Journ., vol. iv. p. 603, 1849.

Insect Pins in Cases of Hare-lip, by George Hayward, M. D. Boston.

Boston Med. and Surg. Journ., vol. xix. p. 153, 1838.

Hare-lip—Nursing during the process of Union (without any strain on the Lip), by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xix. N. S. p. 74, 1850.

On an early Operation in Hare-lip (within 24 hours), by A. L. Peirson, M. D. Salem, Massachusetts.

Boston Med. and Surg. Journ., vol. xlvii. p. 134, 1852.

OPERATIONS ON THE UPPER JAW.

Osteo-sarcoma of the Upper Jaw, with a successful Operation for its removal nearly entire, (that is, of both Superior Maxillæ as far

back as the posterior external portion, adjacent to the Pterygoid Processes,) by David L. Rogers, M.D. New York.

New York Med. Phys. Journ., vol. iii. p. 301, 1824.

Tumor in the Antrum Highmorianum extirpated, by Clarke Wright, M.D. New York.

New York Med. Phys. Journ., vol. iv. 1825.

A Case of Fungus of the Antrum (carotid tied), by Michael A. Finley, M.D. Maryland.

Maryland Med. Recorder, vol. i. p. 97, 1829.

Observations on Tumors of the Upper Jaw, by Horatio G. Jameson, M.D. Baltimore.

Maryland Med. Recorder, vol. i. p. 102, 1829.

Exostosis of the Upper Jaw, treated successfully by B. A. Rodrigues, M.D. Pennsylvania.

Am. Journ. Med. Sciences, vol. xxiv. p. 516, 1839.

Case of Osteo-sarcoma of Upper Jaw, successfully treated by Extirpation of the whole of the Superior Maxillary and Malar Bones, and portions of the Ethmoid and Sphenoid Bones, with Remarks, by Alexander H. Stevens, M.D. New York.

New York Journ. of Med. and Surg., No. iv. p. 249, 1840.

Excision of the Upper Maxillary Bone, by R. D. Mussey, M.D. Cincinnati.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 509, 1842.

Removal of Upper Maxillary Bone successfully performed, by J. C. Warren, M.D. Boston.

Boston Med. and Surg. Journ., vol. xxvi. p. 9, 1842.

Also, *Am. Journ. Med. Sciences*, vol. iii. N. S. p. 506, 1842.

Removal of the Upper Maxillary Bone for Cephalomatous Disease, by J. C. Warren, M.D. Boston.

Boston Med. and Surg. Journ., vol. xxvi. p. 9, 1842.

On Muco-purulent Secretion of the Antrum Highmorianum, by S. P. Hullihen, M.D. Wheeling, Virginia.

Boston Med. and Surg. Journ., vol. xxvi. p. 94, 1842.

Amputation of the Superior Maxillary, Malar, and Palate Bones, for Disease of the Antrum—Recovery, by Daniel Brainard, M.D. Chicago.

Am. Journ. Med. Sciences, vol. xiii. N. S. p. 250, 1847.

Removal of Superior Maxilla, and apparent Cure; Return of the Disease. Second Operation (patient died), by J. Marion Sims, M.D. Alabama.

Am. Journ. Med. Sciences, vol. xiii. p. 340, 1847.

Modified Operation for Excision of the Upper Jaw, cured (without any incision through the cheek), by W. E. Horner, M. D. Philadelphia.

Medical Examiner, vol. vi. N. S. p. 16, 1850.

Observation on Excision of the Superior Maxillary Bone—illustrated by seven cases, by S. D. Gross, M. D. Louisville.

Western Journ. Med. and Surg., vol. x. 3d series, p. 185, 1852.

Resection of Left Half of Upper Jaw (successful at time, but disease returned in 19 months after operation), by Henry H. Smith, M. D. Philadelphia.

Philadelphia Med. Examiner, vol. viii. N. S. p. 226, 1852.

Resection of Superior Maxillary Bone, by D. Gilbert, M. D. Philadelphia. Reported by W. H. Gobrecht, M. D. Philada.

Medical Examiner, vol. viii. N. S. p. 790, 1852.

Resection of Superior Maxillary and Malar Bones (not malignant, cured), by Daniel Brainard, M. D. Chicago.

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 131, 1852.

ON IMMOBILITY OF THE JAW.

Case of Immobility of the Jaw, successfully treated, by Valentine Mott, M. D. Rutgers's College.

Am. Journ. Med. Sciences, vol. v. p. 102, 1829.

Case of Immobility of the Jaw and Taliacotian Operation, by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. ix. p. 47, 1831.

Case of Immobility of the Jaw, successfully treated, by Professor Mott's complicated Lever, and a Modification of his Operation, by Jesse W. Mighels, M. D. Maine.

Am. Journ. Med. Sciences, vol. ix. p. 50, 1831.

On Immobility or incomplete Muscular Anchylosis of the Jaw, by William E. Horner, M. D. Philadelphia.

Am. Cyclopaedia of Med. and Surg., vol. i. p. 470, 1834.

Subcutaneous Division of the Masseter Muscle (for Anchylosis of the Jaw), by J. W. Schmidt, M. D. New York.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 516, 1842.

Two Cases of Immobility of the Lower Jaw, successfully treated by Daniel Brainard, M. D. St. Louis.

Am. Journ. Med. Sciences, vol. vi. N. S. p. 374, 1843.

Claims to Priority on the Division of the Masseter Muscle, &c., in Immobility of the Inferior Maxilla, by John Murray Carnochan, M. D. New York.

Mott's Velpeau by Townsend, vol. ii. p. 20, Appendix, 1847.

Immobility of the Jaw, relieved by Mott's Dilator, by Paul F. Eve, M. D. Georgia.

South. Med. and Surg. Journ., vol. vi. p. 257, 1850.

Case of Immobility of the Lower Jaw from Adhesions, the Result of Salivation, relieved by an Operation, by P. Calhoun, M. D. Louisiana.

Charleston Med. Journ., vol. v. p. 43, 1850.

Case of Immobility of the Lower Jaw, cured by the Division of the Masseter Muscles, by James R. Wood, M. D. New York.

New York Journ. Med., vol. v. N. S. p. 423, 1850.

Cases of Immobility of the Inferior Maxillary Bone produced by the Abuse of Mercury, by H. H. Toland, M. D. California.

Charleston Med. and Surg. Journ., vol. viii. p. 145, 1853.

Operation for Immobility of the Lower Jaw, by J. F. Gaston, M. D. South Carolina.

Charleston Med. Journ., vol. viii. p. 895, 1853.

OPERATIONS ON THE LOWER JAW.

Excision of nearly one-half of the Inferior Maxillary Bone, for Osteo-sarcoma, in 1810, by W. H. Deaderick, M. D. Athens, Tenn. (claiming justly to be the first operation of the kind ever performed, being two years before that of Dupuytren).

Med. Recorder, vol. vi. p. 516, 1823.

Also, *Am. Journ. Med. Sciences*, vol. xiii. N. S. p. 521, 1847.

Case of Fracture of Inferior Maxilla, successfully treated by Seton, by P. S. Physick, M. D. July, 1822.

Philada. Journ. Med. and Phys. Sciences, vol. v. p. 116, 1822.

Case of Osteo-sarcoma, in which the right side of the Lower Jaw was removed successfully after tying the Carotid, by Val. Mott, M. D. New York, 1821.

New York Med. and Phys. Journ., vol. i. p. 385, 1822.

2d Case of Osteo-sarcoma, in which the left Carotid was tied, and a portion of the Lower Jaw removed successfully. March, 1823.

New York Med. Phys. Journ., vol. ii. p. 157, 1823.

3d Case of Osteo-sarcoma on the right side of the Lower Jaw,

removed at the Articulation, the Carotid tied—died fifth day, by Val. Mott, M. D. 1823.

New York Med. Phys. Journ., vol. ii. p. 401, 1823.

Removal of nearly one-half the Lower Jaw, by Thos. Hunt, M. D. Natchez, Miss.

Phila. Med. Recorder, vol. vii. p. 682, 1824.

Case of Amputation of part of the Lower Jaw, by Jno. Wagner, M. D. Charleston, S. C.

New York Med. and Phys. Journ., vol. v. p. 533, 1826.

Also, *Am. Journ. Med. Sciences*, 1824.

Removal of half of the Lower Jaw Bone for Osteo-sarcoma, cured, by J. C. Warren, M. D.

Boston Med. and Surg. Journ., vol. i. p. 90, 1828.

Amputation of the Lower Jaw for Osteo-sarcoma, cured by J. Randolph, M. D. Philadelphia, July, 1829.

Am. Journ. Med. Sciences, vol. v. p. 17, 1829.

Extract from a Report of a Committee upon the Subject of Osteo-sarcoma of the Lower Jaw, to a Medical Society in New York, April 1, 1830, by David L. Rogers, M. D., Chairman.

Am. Journ. Med. Sciences, vol. vi. p. 533, 1830.

Longitudinal Section of the Lower Jaw for the removal of a Tumor, by J. Rhea Barton, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. vii. p. 331, 1831.

Case of Osteo-sarcoma of the Lower Jaw, successfully treated by Amputation of the Bone, by W. W. Anderson, M. D. S. Carolina.

Am. Journ. Med. Sciences, vol. x. p. 315, 1832.

Case of Exsection of half of the Lower Jaw (disarticulated), by George W. Campbell, M. D. Tenn.

Trans. Journ. Med., vol. vi. p. 400, 1833.

Amputation of nearly half of the Lower Jaw, by Paul F. Eve, M. D. Georgia.

Am. Journ. Med. Sciences, vol. xxiii. p. 261, 1839.

Osteo-sarcoma and Excision of a large portion of the Lower Jaw, by J. Wort, M. D. Indiana.

Am. Journ. Med. Sciences, vol. xxiv. p. 260, 1839.

Osteo-sarcoma of the Lower Jaw, removed by Dr. Batchelder, June, 1825. Reported by S. W. Williams, M. D. Deerfield.

Boston Med. and Surg. Journ., vol. xxii. p. 39, 1840.

Case of Excision of a portion of the Inferior Maxillary Bone, by H. H. Toland, M. D. S. Carolina.

Am. Journ. Med. Sciences, vol. i. N. S. p. 534, 1841.

Osteo-sarcoma of Lower Jaw, Amputation and Cure, by Charles Bell Gibson, M. D. Baltimore.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 277, 1842.

Osteo-sarcoma of Lower Jaw, Excision and Cure, by James P. Jervcy, M. D. Charleston.

Am. Journ. Med. Sciences, vol. viii. N. S. p. 111, 1844.

Exsection of Inferior Maxillary Bone, by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. ix. N. S. p. 525, 1845.

Excision of a portion of the Lower Jaw, by N. Pinkney, M. D., U. S. Navy.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 335, 1846.

Osteo-sarcoma of the Lower Jaw, Resection of Bone and Cure, by J. Marion Sims, M. D. Alabama.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 128, 1846.

Osteo-sarcoma of Lower Jaw, removal of the Body of the Bone anterior to its angle, without external incision, by J. Marion Sims, M. D. Alabama.

Am. Journ. Med. Sciences, vol. xiv. N. S. p. 370, 1847.

Fibrous Tumor of the Lower Jaw, in which the left half of the Bone was successfully removed (disarticulated), by S. D. Gross, M. D. Louisville.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 344, 1848.

Exsection and Disarticulation of the Lower Jaw for Osteo-sarcoma, by Geo. C. Blackman, M. D. New York.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 93, 1849.

Exsection of three inches Inferior Maxilla for Spina Ventosa, cured by Paul F. Eve, M. D.

South. Med. and Surg. Journ., vol. vi. p. 261, 1850.

Case of Elongation of the Lower Jaw and Distortion of the Face and Neck, caused by a Burn; successfully treated by Operations, by S. P. Hullihen, M. D. Wheeling, Va.

Med. Examiner, vol. vi. p. 188, 1850.

Resection of a portion of the Lower Jaw (cured), by Drs. Gaines and Henry. Hopkinsville, Ky.

West. Journ. Med. and Surg., vol. xi. 3d series, p. 217, 1853.

Observations on Excision of the Inferior Maxillary Bone, illustrated by five Cases, by S. D. Gross, M. D. Louisville.

West. Journ. Med. and Surg., vol. x. 3d series, p. 277, 1852.

Resection of the Chin, with a portion of the Body of the Lower Jaw, by Isaac Greene, M. D. N. Y.

N. Y. Med. Gazette, vol. iii. p. 266, 1852.

Extirpation of more than half the Lower Jaw for a Cancerous Degeneration (died), by F. H. Hamilton, M. D. Buffalo, N. Y.

N. Y. Journ. Med., vol. viii. N. S. p. 289, from *Buffalo Med. Journ.*

Amputation of entire Lower Jaw, with Disarticulation of both Condyles, by J. M. Carnochan, M. D. N. Y.

N. Y. Journ. Med., vol. viii. N. S. p. 9, 1852.

Extirpation of the left half of the Lower Jaw, with the Submaxillary Gland and Anterior Lobe of the Parotid, by Jno. G. F. Holston, M. D. Zanesville, Ohio.

West. Lancet, vol. xiii. p. 15, 1852.

Resection of two-thirds of the Inferior Maxilla (successful), by Carter P. Johnson, M. D. Richmond.

Med. Examiner, vol. vii. N. S. p. 644, 1851.

Resection of half the Lower Jaw (successful), by Wm. Gibson, M. D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 30, 1851.

Amputation of entire Lower Jaw for Osteo-sarcoma (patient lived two years subsequently, and died of another disease), by Professor Ackley, Cleveland, Ohio. (Details to be published hereafter.)

N. Y. Journ. Med., vol. x. N. S. p. 288, March, 1853.

Resection and Disarticulation of half of Lower Jaw for Spina Ventosa, by Chas. Bell Gibson, M. D. Richmond, Va.

Stethoscope, vol. i. p. 144, 1851.

On the Claims of Priority in the Exsection and Disarticulation of the Lower Jaw, by George C. Blackman, M. D. N. Y.

N. Y. Journ. Med., vol. viii. p. 280, 1852.

Excision of a portion of the Inferior Maxillary Bone for Caries, by W. G. Bullock, M. D. Savannah.

Am. Journ. Med. Sciences, vol. xxvi. N. S. p. 129, 1853.

Cartilaginous Exostosis of Condyle, Ramus, and Angle of Lower Jaw, for which Resection, with removal of Parotid gland and Zygomatic arch was successfully performed, by Daniel Brainard, M. D. Chicago.

Am. Journ. Med. Sciences, vol. xxvi. N. S. p. 397, 1853.

Extensive Enchondroma of the Inferior Maxilla removed by section of the bone from the Symphysis to the angle on the right side, by D. Gilbert, M. D. Philadelphia. Reported by W. H. Gobrecht, M. D.

Med. Examiner, vol. ix. p. 746, 1853.

OPERATIONS ON THE FACE.

Operation for the removal of a large Tumor on the Face, by Jas. Webster, M. D. Philadelphia.

Phila. Med. Recorder, vol. viii. p. 275, 1825.

Case of Deformity of the Mouth from a Burn, successfully treated by Dieffenbach's Method, by T. D. Mütter, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xx. p. 341, 1837.

Plastic Operations, by J. Pancoast, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 337, 1842.

Plastic Operations, by J. Pancoast, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. v. N. S. p. 99, 1843.

Genio-plasty, by George C. Blackman, M. D. New York.

Am. Journ. Med. Sciences, vol. x. N. S. p. 327, 1845.

A Case of Cheilo-plastic Operation, by Abraham Stout, M. D. Easton, Pa.

Med. Examiner, vol. vi. p. 13, 1850.

Syncope from entrance of Air into the Facial Vein during removal of Small Tumour below the Jaw, by Moses Gunn, M. D. Michigan.

N. Y. Journ. Med., vol. viii. N. S. p. 356, 1852.

OPERATIONS ON THE TONGUE.

Amputation of the Tongue for Enlargement (the portion amputated measured—length $2\frac{3}{4}$ inches, circumference $7\frac{1}{2}$ inches, thickness $1\frac{1}{2}$ inches), cured by H. S. Newman, M. D. Warren County, Penn.

Med. Recorder, vol. vii. p. 541, 1824.

Case of Glossitis, attended with alarming Symptoms of Suffocation, removed by Deep Incisions made into the Substance of the Tongue, by Abner Hopton, M. D. N. Carolina.

Am. Journ. Med. Sciences, vol. iv. p. 533, 1829.

Operation for Cancer of the Tongue (cured), by J. C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. ii. p. 157, 1829.

Chronic Intumescence of the Tongue (very large), treated by Amputation (cured), by Thos. Harris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. vii. p. 17, 1830.

Case of Hypertrophy of the Tongue (operated on), by Thomas Wells, M. D. Columbia, S. Carolina.

Am. Journ. Med. Sciences, vol. x. p. 35, 1832.

Carcinoma of the Tongue, successfully treated with the ligature, by M. Donnellan, M. D. Louisiana.

Am. Journ. Med. Sciences, vol. xvii. p. 540, 1835.

Case of Congenital Enlargement of the Tongue (Lingua Vitula), by Thos. Harris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xx. p. 15, 1837.

Case of Enlarged Tongue, operated on by R. D. Mussey, M. D. Fairfield, N. Y.

Am. Journ. Med. Sciences, vol. xxi. p. 394, 1837.

Removal of Cancer of the Tongue (believed to be rarely successful), treated by Geo. Hayward, M. D. Boston.

Boston Med. and Surg. Journ., vol. xix. p. 158, 1838.

Case of Congenital Glossoceles, amputated successfully by M. G. Delaney, M. D., U. S. Navy.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 294, 1848.

Removal of a Foreign Body (Pin) from the Duct of Wharton, by H. F. Campbell, M. D. Georgia.

Am. Journ. Med. Sciences, vol. xv. N. S. p. 572, 1848.

Observations on Ranula, with Cases, Treatment, and Cure (iodine injected into tumor), by Jas. M. Gordon, M. D. Ga.

Southern Med. and Surg. Journ., vol. v. p. 65, 1849.

OPERATIONS ON THE THROAT.

Obstinate Cough, caused by Elongation of the Uvula, in which a portion of that Organ was cut off, with a Description of the Instrument employed for that purpose, and also for Excision of Scirrhus Tonsils, by P. S. Physick, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. i. p. 262, 1827.

Case of Consumption (?) relieved by Truncating the Uvula, by Augustus W. Mills, M. D. Kentucky.

Trans. Journ. Med., vol. ii. p. 530, 1829.

Extraction of a Thimble from the Pterygoid Fossa, by Isaac Parrish, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xvii. p. 540, 1835.

Cancer of the Throat—Operation—Recovery—but the patient

subsequently died of Peritonitis (remarkable transposition of all the organs), by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xix. p. 120, 1836.

OPERATIONS ON THE TONSILS.

The Double Canula and Wire Ligature, recommended in extirpating Tonsils and Hæmorrhoidal Tumors, by P. S. Physiek, M. D. Philadelphia.

Phil. Journ. of Med. and Phys. Sciences, vol. i. p. 17, 1820.

Treatment of Enlarged and Indurated Tonsils, with a new Mode (ligature) of removing these and Polypous Tumors, by Alexander H. Stevens, M. D. N. York.

From N. Y. Med. and Phys. Journ., vol. vi. p. 523, 1827.

On an Improved Instrument for excising Tonsils and Uvula, by C. B. Matthews, M. D. Philadelphia.

Phil. Med. Recorder, vol. xiii. p. 309, 1828.

Remarks on the various Modes generally adopted for the removal of the Tonsils, by Alex. E. Hosack, M. D. N. York.

N. Y. Journ. Med. and Phys. Sciences, vol. i. p. 262, 1828.

Description of a Forceps used to facilitate the Extirpation of the Tonsils, and invented by P. S. Physiek, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. ii. p. 116, 1828.

Remarks on Enlarged Tonsils, with a new Instrument for Excision, by Abram. L. Cox, M. D. N. York.

N. Y. Med. and Phys. Journ., N. S. vol. ii. p. 52, 1830.

New Instrument for excising Tonsils, by David L. Rogers, M. D. N. York.

N. Y. Med. and Phys. Journ., N. S. vol. ii. p. 13, 1831.

A new Instrument for extirpating Tonsils, by J. K. Mitchell, M. D. Philadelphia.

North Am. Med. and Surg. Journ., vol. xi. p. 239, 1831.

An Essay on Excision of the Tonsils with an Instrument, by Geo. Bushe, M. D. N. York.

Med.-Chirurg. Bulletin, vol. ii. p. 161, 1832.

Description of an Instrument for the Excision of the Tonsils, by Wm. B. Fahnestock, M. D. Pennsylvania.

Am. Journ. Med. Sciences, vol. xi. p. 249, 1832.

Instrument for the Excision of Tonsils, by N. R. Smith, M. D. Baltimore.

North Am. Archives, Med. and Surg. Sciences, vol. i. p. 88, 1835.

On the Common Induration of the Tonsils, and a Description of an Instrument for their Excision, by John C. Warren, M.D. Boston.

Surg. Obs. on Tumors, with Cases and Operations. Boston, 1839.

Remarks on the Enlargement of the Tonsils, attended by certain Deformities of the Chest. By J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxiv. p. 523, 1839.

Tonsilotomy—Profuse Hemorrhage—by F. H. Hamilton, M. D. Buffalo.

Buffalo Med. Journ., vol. iv. p. 217, 1849.

Case in which a large Thimble remained for two weeks in Posterior Nares without detection (removed), by Richard L. Howard, M. D. Columbus, Ohio.

Ohio Med. and Surg. Journ., vol. v. p. 215, 1853.

ON STAPHYLORAPHY.

Suture of Palate in Infancy, believed to have been successfully performed by Nathan Smith, M. D. Yale College.

N. Y. Med. and Phys. Journ., vol. v. p. 525, 1826.

Staphyloraphy successfully performed, by A. H. Stevens, M. D. N. Y.

North Am. Med. and Surg. Journ., vol. iii. p. 233, 1827.

Operation in May 1824, for the Cure of Natural Fissure of the Soft Palate (the first in America, and performed without knowledge of the operations of Roux), by J. C. Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. iii. p. 1, 1828.

Extensive Division of the Soft Palate (from a wound) sewed with Physick's Needle, &c., by Thos. Wells, M. D. Columbia, S. C.

Am. Journ. Med. Sciences, vol. x. p. 32, 1832.

Observations on Staphyloraphy with a new Instrument, by N. R. Smith, M. D. Baltimore.

North Am. Archives, vol. i. p. 27, 1835.

Congenital Fissures of the Palate operated on, by James Deane, M. D. Greenfield, 1837.

Boston Med. and Surg. Journ., vol. xvi. p. 333, 1837.

On Staphyloraphy, by Jno. P. Mettauer, M. D. Va.

Am. Journ. Med. Sciences, vol. xxi. p. 309, 1837.

On the Use of the Interrupted Suture in Cases of Cleft Palate (with a description of a needle for it and hare-lip), by E. H. Dixon, M. D. New York.

Boston Med. and Surg. Journ., vol. xxv. p. 329, 1841.

Cases of Cleft Palate (treated by Physick's Needle), by Thos. D. Mütter, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 74, 1841.

On Staphyloraphy, by Jos. Pancoast, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. vi. N. S. p. 66, 1843.

Operations for Fissures of the Soft and Hard Palate, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. vi. N. S. p. 257, 1843.

Operation for Fissure of the Hard and Soft Palate, with the Result of 24 Cases, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xv. N. S. p. 329, 1848.

On Fissure of the Palate, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxv. N. S. p. 95, 1853.

OPERATIONS ON THE EAR.

Extraction of Foreign Substances from the Ear, (by means of a thread attached to the article by glueing with shell lac,) by Charles Hooker, M. D. New Haven.

Boston Med. and Surg. Journ., vol. x. p. 317, 1834.

Polypi of the Meatus Auditorius Externus removed by Ligature, by E. J. Davenport, M. D. Boston, 1837.

Boston Med. and Surg. Journ., vol. xvii. p. 235, 1837.

Congenital Absence of Meatus Auditorius Externus of both Ears without much impairing the hearing, by R. D. Mussey, M. D. Fairfield, N. Y.

Am. Journ. Med. Sciences, vol. xxi. p. 377, 1838.

On the Extraction of Foreign Bodies from the Meatus Auditorius Externus, by J. Marion Sims, M. D. Alabama.

Am. Journ. Med. Sciences, vol. ix. N. S. p. 336, 1845.

Fibrous Tumor removed from the Lobe of the Ear, by Geo. W. Norris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xx. N. S. p. 557, 1850.

Maggots, probably 40, in the Ear (from previous entrance of a fly), removed by Frank H. Hamilton, M. D. Buffalo.

Buffalo Med. Journ., vol. vi. p. 10, 1850.

Contributions to Aural Surgery—Analysis of 140 Cases of Diseases of the Ear, by Edward H. Clark, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 31, 1852.

On Obstruction of the Pharyngeal Orifice of the Eustachian Tube, by Jno. Neill, M. D. Philadelphia.

Med. Examiner, vol. ix. p. 626, 1853.

PART III.

PAPERS RELATING TO OPERATIONS ON THE NECK
AND TRUNK.

ON EXTIRPATION OF THE PAROTID GLAND.

A CASE of successful Extirpation of the whole of the Parotid Gland for Scirrhus, by George McClellan, M.D. Philadelphia, 1826.

The operation of Dr. Warren, of Boston, in 1798, was the first case; that of Dr. McClellan, of Franklin County, Pa., in 1805, the second; that of Dr. White, of Hudson, in 1808, the third; that of Dr. Sweat, of Maine, in 1811, the fourth; and the operation of Dr. George McClellan, referred to in his paper, was the fifth time it was repeated in the United States, though the first published.

New York Med. and Phys. Journ., vol. v. p. 649, 1826; also *Am. Med. Review and Journal*.

Case of Extirpation of the Right Parotid for Melanotic Enlargement, by George McClellan, M.D. Philadelphia, 1829, being his second case.

New York Med. and Phys. Journ., vol. ii. N.S. p. 309, 1830.

An Account of the Extirpation of the Parotid Gland, by George McClellan, M.D. Philadelphia.

West. Journ. of Med. and Phys. Sciences, vol. iv. p. 465, 1831.

A Case of Extirpation of the Parotid Gland, by Valentine Mott, M.D. New York.

Am. Journ. Med. Sciences, vol. x. p. 17, 1831.

Three Cases in which the Parotid Gland was successfully removed (December 14, 1827, September 16, 1830, and one not dated), by George Bushe, M.D. New York.

Medico-Chirurgical Bulletin, vol. ii. p. 133, 1832.

Extirpation of the Parotid Gland, with other Cases, by Nathan R. Smith, M.D. Baltimore.

Am. Journ. Med. Sciences, vol. xxiii. p. 59, 1839.

A Case of Extirpation of the Parotid Gland, by J. Randolph, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxiii. p. 517, 1839.

A Case of Extirpation of the Parotid Gland in 1805, by John McClellan, M. D. Franklin County, Pennsylvania.

Am. Journ. Med. Sciences, vol. vii. N. S. p. 499, 1844.

Extirpation of a Scirrhus Parotid Gland, by H. H. Wheeler, M. D. Pennsylvania.

Am. Journ. Med. Sciences, vol. ix. N. S. p. 520, 1845.

Extirpation of the Parotid Gland, by William E. Horner, M. D. Philadelphia.

Phila. Med. Ex., vol. vii. N. S. p. 30, 1851.

Extirpation of the Parotid Gland (under chloroform), by A. B. Shipman, M. D. N. Y.

Nelson's North. Lancet, vol. vi. p. 143, 1852.

Removal of the Parotid Gland (cured), by H. H. Toland, M. D. San Francisco.

Charleston Med. and Surg. Journ., vol. viii. p. 73, 1853.

Successful Removal of the Parotid Gland, by A. J. Wedderburn, M. D. N. Orleans.

N. Y. Journ. Med., vol. vii. N. S. p. 411, 1851, from *N. Orleans Med. Register*.

Cases (3) of Extirpation of Parotid Glands (one in 1811, one in 1814, and one in 1841, cured), by Moses Sweat, M. D. Maine.

N. Y. Journ. Med., vol. vii. N. S. p. 23.

Successful Extirpation of a Scirrhus Parotid Gland, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 332, 1852.

ON DEFORMITIES OF THE NECK.

A Case of Deformity from Burns (on the Face and Neck) relieved by an Operation, by T. D. Mütter, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 66, 1842.

A Case of Division of the Sterno-Cleido-Mastoid Muscle, for Wry Neck, by J. Mason Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxv. p. 121, 1841.

A Case of Torticollis successfully treated by Myotomy and an Apparatus, by John B. Brown, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxvi. p. 58, 1842.

Cases of Wry Neck cured without cutting (gradual extension

by the hand applied to the head, the patient being in a state of anæsthesia), by Gurdon Buck, Jr., M. D. New York.

N. Y. Med. Times, vol. ii. p. 131, 1852.

OPERATIONS ON THE ŒSOPHAGUS.

Case in which a Copper Coin remained thirteen years in the Œsophagus, by John Syng Dorsey, M. D. Philadelphia.

New York Med. and Philosoph. Journ., vol. iii. p. 173, 1811; also *Philad.*

Med. Museum., vol. i. N. S. p. 125, 1811.

Two Cases in which Poison was removed from the Stomach by a new mode (the Stomach-Tube), by P. S. Physick, M. D. Philad.

Eclectic Repert. and Analytical Review, vol. iii. p. 111, 1813.

A Case of Stricture of the Œsophagus, cured by Caustic, by Charles T. Hildreth, M. D. Haverhill.

New England Journ. of Med. and Surg., vol. x. p. 235, 1821.

Extraction of a Fish-Hook and Line from the Stomach, by slipping a Perforated Bullet over the Line and Point of the Hook, by Dr. Brite. Communicated by S. Brown, M. D., of Lexington, Kentucky.

Am. Med. Record, vol. vi. p. 581, 1823.

A new Instrument for extracting Coins, &c., from the Œsophagus, by Nathan Smith, M. D. Yale College.

New York Med. and Phys. Journ., vol. iv. p. 576, 1825.

Case of Stricture of the Œsophagus (with a new Instrument for its Relief), by H. G. Jameson. Baltimore.

Med. Record., vol. viii. p. 1, 1825.

Description of an improved Instrument for extracting Poisons from the Stomach, with Statements assigning the Credit of the Invention of the Stomach-Tube to P. S. Physick, M. D., in 1800 (he being then ignorant that Dr. Monroe, of Edinburgh, had done the same thing), by C. B. Matthews, M. D. Philadelphia.

Am. Med. Record, vol. x. p. 322, 1826.

On the Removal of Foreign Bodies from the Œsophagus, by means of Forceps, &c., by Henry Bond, M. D. Philadelphia.

North American Med. and Surg. Journ., vol. vi. p. 278, 1828.

Description of a new Œsophagus Forceps, by Constantine Weever, M. D. Michigan.

Am. Journ. Med. Sciences, vol. xiv. p. 111, 1834.

Description of a new form of Stomach-Pump, by P. B. Goddard, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xv. p. 262, 1834.

Practical Observations on Organic Obstructions of the Œsophagus, preceded by a Case which called for Œsophagotomy, and subsequent Tracheotomy, with accompanying Illustrations, by John Watson, M. D. New York.

Am. Journ. Med. Sciences, vol. viii. N. S. p. 309, 1844.

Case of Ulceration and Stricture of the Œsophagus, with Remarks on Nutritive Enemata, as a means of sustaining life in such cases, by D. J. C. Cain, M. D. Charleston.

Charleston Med. Journ., vol. iii. p. 393, 1848.

Death from a Foreign Body (a piece of Bone) cutting from the Pharynx into the Larynx, by Paul F. Eve, M. D. Georgia.

Southern Med. and Surg. Journ., vol. v. p. 73, 1849.

Stricture of the Œsophagus (caused by swallowing Potash Solution, temporary Relief by Dilatation), died, by Robert H. Cummins, M. D. Wheeling.

Am. Journ. Med. Sciences, vol. xxii. N. S. p. 409, 1851.

Extirpation of Pharyngeal Tumours, by L. A. Dugas, M. D. Georgia.

Southern Med. and Surg. Journ., vol. ix. p. 264, 1853.

Case of Stricture of the Œsophagus (cured by Dilatation), by Wm. Johnson, M. D. New Jersey.

New Jersey Med. Reporter, vol. vi. p. 173, 1853.

ON TRACHEOTOMY AND ŒDEMATOUS LARYNGITIS.

Case of Hydrophobia, with the proposal of Tracheotomy, by P. S. Physick, M. D. Philadelphia, 1801.

New York Med. Repository, vol. v. p. 1, 1802.

Case of Tracheotomy (cured) for removal of a Lead Bullet in the Trachea, by John Newman, M. D. Salisbury, North Carolina.

New York Med. Repository, vol. x. p. 250, 1807.

Tracheotomy for Croup (died), by Dr. Thompson.

New England Journ. Med. and Surg., vol. v. p. 318, 1816.

Case of successful Tracheotomy, for the Extraction of a Foreign Substance (a Bean), by Amasa Trowbridge, M. D., of Jefferson County. New York.

New York Med. Repository, vol. xx. p. 79, 1820.

Bronchotomy successfully performed for the removal of a Watermelon Seed, by H. G. Jameson, M. D. Baltimore.

Am. Med. Recorder, vol. v. p. 673, 1822.

Memoir on Bronchotomy, by H. G. Jameson, M. D. Baltimore.

Am. Med. Recorder, vol. vi. p. 151, 1823.

Case of a Pebble successfully extracted by Bronchotomy, by H. G. Jameson, M. D. Baltimore.

Am. Med. Recorder, vol. vii. p. 36, 1824.

Three Cases of Bronchotomy, by S. Annan, M. D. Emmetsburg.

Am. Med. Recorder, vol. vii. p. 42, 1824.

Case of Tracheotomy (successful) for the removal of a Watermelon Seed, by Henry S. Waterhouse, M. D. Franklin County, New York.

Philadelphia Journ. of Med. and Phys. Sciences, vol. viii. p. 391, 1824.

Case of a Bean extracted successfully by Bronchotomy, by Joseph Palmer, M. D.

Am. Med. Recorder, vol. vii. p. 32, 1824.

Two Cases of Bronchotomy (in which one was cured, one died), by Richard Burgess, M. D.

Am. Med. Recorder, vol. vii. p. 111, 1824.

Case of Tracheotomy for the removal of a Bean (cured), by Calvin Jewett, M. D. Newberg, Vermont.

New England Journ. of Med. and Surg., vol. xiii. p. 237, 1824.

Case of Laryngotomy for a Watermelon Seed (cured), by Samuel A. Cartwright, M. D. Natchez.

New England Journ. of Med. and Surg., vol. xiv. p. 135, 1825.

Case of Tracheotomy for the removal of a Bean (cured), by Peter P. Woodbury, M. D. Bedford, New Hampshire.

New England Journ. of Med. and Surg., vol. xiv. p. 32, 1825.

Two Cases of Foreign Bodies lodged in the Trachea, one of which was removed by Tracheotomy, and the other by introducing the Forceps into the Trachea, by Enos Barnes, M. D., of Yates County, New York.

New York Med. and Phys. Journ., vol. vi. p. 78, 1827.

Operation of Laryngotomy and Tracheotomy (successfully performed at the same time, on the same Patient, for the removal of an Extraneous Body (a Grain of Corn) from the Larynx, by Abner Hopton, M. D. North Carolina.

Am. Journ. Med. Sciences, vol. iv. p. 534, 1829.

Case of Tracheotomy for the removal of a Bean (cured), by Zadok Howe, M. D. Massachusetts.

Am. Journ. Med. Sciences, vol. iii. p. 347, 1829.

Case of Laryngotomy (for the removal of a Watermelon Seed, cured), by Joseph F. E. Hardy, M. D. North Carolina.

Transylvania Journ. of Med., vol. iii. p. 267, 1830.

Operation of Tracheotomy (successfully) performed for the removal of a Watermelon Seed, by Horatio G. Jameson, M. D. Baltimore.

Maryland Med. Recorder, vol. ii. p. 594, 1831.

An unsuccessful Case of Cynanche Trachealis, in which Tracheotomy was resorted to, by E. Atlee, M. D. Lancaster.

West. Journ. of Med. and Phys. Sciences, vol. iv. p. 23, 1831.

Remarkable Instance of a Brass Nail remaining in the Lungs for more than a year, by Amariah Brigham, M. D. Hartford, Conn.

Am. Journ. Med. Sciences, vol. xviii. p. 46, 1836.

Case of Bronchotomy for the removal of an Iron Nail (1 inch and $\frac{3}{4}$ ths long, and weighing 55 grains) from a child three years of age, nine days after it was swallowed, by Calvin Jewett, M. D. St. Johnsbury, Vermont.

Boston Med. and Surg. Journ., vol. xvi. p. 91, 1837.

Foreign Bodies (a Pipe-stem $1\frac{3}{4}$ inches long) in the Trachea removed by Tracheotomy (cured), by Charles Hall, M. D. Vermont.

Am. Journ. Med. Sciences, vol. ix. N. S. p. 357, 1845.

Foreign Bodies in the Air-Passages (four Cases, viz., Pin in Larynx, Carpet-Tack, Horseshoe Nail, and Bean), Tracheotomy used in one Case, by J. Mason Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxxvii. p. 389; also

Am. Journ. Med. Sciences, vol. xv. N. S. p. 315, 1848.

Tracheotomy, successfully performed, for Membranous Croup (by J. Pancoast, M. D.), reported by C. D. Meigs, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 529, 1848.

Case of Membranous Croup of a severe character, and attended with all the symptoms of approaching death, cured without an operation for Tracheotomy, by Isaac Parrish, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 530, 1848.

A Foreign Body (Grain of Corn) in the Trachea, cured by Tracheotomy, by William Davidson, M. D. Madison County, Indiana.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 263, 1848.

Also, *Western Lancet*, May, 1848.

Œdematous Laryngitis successfully treated by Scarification of the Glottis and Epiglottis, by Gurdon Buck, Jr., M.D. New York.

Transact. Amer. Med. Association, vol. i. p. 135, 1848; also *Am. Journ. Med. Sciences*, vol. xvii. N. S. p. 240, 1849.

History of five Cases of Pseudo-Membranous Croup, in which Tracheotomy was performed (three cured, two died, Operation by J. Pancoast, M.D.), with Remarks on the Treatment, and on the Operation, by J. Forsyth Meigs, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 307, 1849.

Case of Tracheotomy for Laryngitis (died), by Dr. Townsend. Boston. (Reported by Dr. J. B. S. Jackson.)

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 28, 1849.

Tracheotomy (successful), for Abscess at Root of Tongue, by Daniel Brainard, M.D. Chicago.

Northwest Med. and Surg. Journ. vol. iii. p. 316, 1850.

Tracheotomy successfully performed in 3 Cases for the removal of a Foreign Body, by D. Gilbert, M.D. Philadelphia.

(In the first, it was a grain of coffee; operation 42 hours after its entrance; child $3\frac{1}{2}$ years. In the second, a piece of raw sweet potato. In the third, aged six years, it was a grain of corn; operation a few days subsequently.)

Am. Journ. Med. Sciences, vol. xxi. N. S. p. 74, 1851.

Pseudo-membranous Croup—Tracheotomy (as last resort), portion excised, no canula, death, by R. H. McIlvaine, M.D. N. Carolina.

Am. Journ. Med. Sciences, vol. xxi. N. S. p. 387, 1851.

Œdematous Laryngitis successfully treated by Scarifications of the Glottis and Epiglottis, by R. A. Kinlock, M.D. Charleston.

Charleston Med. Journ., vol. vi. p. 517, 1851.

Tracheotomy for Croup (fatal 17 hours after Operation), by Carter P. Johnson, M.D. Richmond.

Stethoscope, vol. i. p. 670, 1851.

Tracheotomy for Œdema of Glottis (died of Pneumonia), by S. Parkman, M.D. Boston.

Am. Journ. Med. Sciences, vol. xxi. N. S. p. 40, 1851.

Œdema-glottidis successfully treated by Scarification, by Dr. Clarke. New York.

Western Lancet, vol. xii. p. 306, 1851.

From *N. Y. Register of Med. and Pharmacy*.

Tracheotomy successfully performed for Croup, by Gurdon Buck, Jr., M.D. New York.

New York Journ. Med., vol. vii. N. S. p. 269, 1851.

Tracheotomy successfully performed for Œdematous Laryngitis, by W. D. Stephenson, M. D. Mount Pleasant, Alabama.

Western Journ. of Med. and Surg., vol. viii. p. 91, 1851.

Tracheotomy for Croup (cured), by Joseph T. Pitney, M. D. Morristown, New Jersey. (Reported by L. Condiot, M. D., N. J.)

New Jersey Med. Reporter, vol. v. p. 332, 1852.

Laryngotomy, successfully performed in a Case of Foreign Body in the Larynx (piece of Almond Shell lodged in Left Ventricle), by G. R. Morehouse, M. D. Philadelphia.

Philadelphia Med. Examiner, vol. viii. N. S. p. 215, 1852.

Tracheotomy for the Relief of Croup (Tracheal Mucous Membrane healthy when opened—died 42 hours), by Henry H. Smith, M. D. Philadelphia.

Philadelphia Med. Examiner, vol. viii. N. S. p. 222, 1852.

Two Cases of Tracheotomy for Foreign Bodies (Coffee and Corn Grain), both cured, by John Fred. May, M. D. Washington.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 413, 1852.

Tracheotomy in Œdema of Glottis (cured); death six months subsequently from soldering becoming softened, and permitting the tube to fall into the Bronchia, by Dr. Wederstaul, of New Orleans. (Reported to Society of Medical Improvement, Boston, by Dr. Alley.)

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 87, 1852.

Laryngotomy, in consequence of Suffocation from Enlarged Tonsils (died), by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 96, 1852.

Tracheotomy successfully performed (for Asphyxia from Acute Laryngitis), by Joseph Paneoast, M. D. (Communicated by Joseph Mauran, M. D. Providence.

Boston Med. and Surg. Journ., vol. xlvii. p. 17, 1852.

Membranous Croup successfully treated by Tracheotomy, by Daniel Ayres, M. D. New York.

N. Y. Journ. Med., vol. ix. N. S. p. 69, 1852.

Tracheotomy performed for the Relief of Epilepsy (died subsequently in a fit; operation performed March 18; died with tube in trachea, May 2), by John Neill, M. D. Philadelphia.

Trans. of Phil. College of Phys. June, 1852.

Also *Am. Journ. Med. Sciences*, vol. xxv. N. S. p. 274, 1853.

Bean in Trachea—Tracheotomy—Cure, by Moses Hoyt, M. D. Ohio.

Am. Journ. Med. Sciences, vol. xxv. N. S. p. 267, 1853.

Membranous Croup—Tracheotomy—its Advantages—fatal termination twelfth day, by Henry J. Bigelow, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxvi. N. S. p. 80, 1853.

Tracheotomy for a Foreign Substance (Grain of Corn) in the Trachea, by B. F. Trabue, M. D. Kentucky.

Am. Journ. Med. Sciences, vol. xxv. N. S. p. 556, 1853.

Tracheotomy successfully performed (in extreme cases for acute Laryngitis), by Dr. Foster, New Orleans.

Boston Med. and Surg. Journ., vol. xlviii. p. 168, 1853.

From *New Orleans Med. and Surg. Journ.*

Cockle Bur in Rima Glottidis removed, after several days, by curved polypus forceps, by L. A. Dugas, M. D. Augusta, Ga.

Am. Journ. Med. Sciences, vol. xxvi. N. S. p. 556, 1853.

From *Southern Med. and Surg. Journ.*, August, 1853.

Tracheotomy for a Foreign Body (chip of Bone in Soup), successful, by W. H. Mussey, M. D. Cincinnati.

Western Lancet, vol. xiv. p. 660, 1853.

OPERATIONS FOR TUMORS ON THE NECK.

Case of Bronchocele relieved by taking up one of the Superior Thyroid Arteries, by H. G. Jameson, M. D. Baltimore.

Am. Med. Record., vol. v. p. 116, 1822.

Case of Encysted Meliceris Tumor of the Neck (cured by Puncture, and Injection of Wine), by Andrew Park, M. D. Eatonton, Georgia.

Philada. Journ. of Med. and Phys. Sciences, vol. vi. p. 130, 1823.

Case of (Adipose Sarcomatous) Tumor (weighing eight pounds) extirpated successfully (from the side of the neck), by David L. Rogers, M. D. New York. Communicated by P. Cadwallader, M. D.

Philadelphia Journ. of Med. and Phys. Sciences, vol. xiii. p. 161, 1826.

Case of a large Encysted Tumor, on the Side of the Neck, successfully removed, by Alexander H. Stevens, M. D. New York.

New York Med. and Phys. Journ., vol. v. p. 311, 1826.

Case of an Operation for the Removal of a formidable Tumor from the Neck (cured), by John C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. i. p. 26, 1828.

Case of the Removal of a Tumor of the Neck, in which the Posterior Jugular Vein was cut off (cured), by John C. Warren, M. D.

Boston Med. and Surg. Journ., vol. i. p. 367, 1828.

Case of a Tumor in the Neck, with an Account of the Operation for its Removal, by G. Hayward, M. D. Boston.

Am. Journ. Med. Sciences, vol. viii. p. 352, 1831.

Case of the Removal of a large Steatomatous Tumor of the Neck, by John C. Brent, M. D. Kentucky.

Western Journ. of Med. and Phys. Sciences, vol. iv. p. 487, 1831.

Case of Extirpation of a Tumor of the Neck, in which the Carotid Artery and Internal Jugular Vein were tied (died), by William Gibson, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xiii. p. 305, 1833.

Case of Extirpation of a Tuberculated Sarcoma, from the Neck, by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. xii. p. 121, 1833.

On Extirpation of Tumors on the Neck, by N. R. Smith, M. D. Baltimore.

Am. Journ. Med. Sciences, vol. xiv. p. 526, 1834.

Extirpation of the Thyroid Gland (died 13th day), by Nathan R. Smith, M. D. Baltimore.

North American Archives Med. and Surg. Sciences, vol. ii. p. 309, 1835.

Case of Attempt at Suicide, in which the Internal Jugular Vein was partially divided; successfully secured by Ligature, by John G. Morgan, M. D. Geneva, New York.

Am. Journ. Med. Sciences, vol. xviii. p. 330, 1836.

Case of Excision of a large Tumor on the Neck, by R. D. Mussey, M. D. Ohio.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 253, 1842; also *Western Lancet*, May, 1842.

Case of Tumor of the Thyroid Gland successfully extirpated, by Otis Hoyt, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxxv. p. 297, 1846.

On Hydrocele of the Neck, by Thos. D. Mütter, M. D. Philad.

Medical Examiner, vol. vi. N. S. p. 257, 1850.

Tumor of Neck of extraordinary size (weighed nearly 12 pounds, and non-malignant), successfully removed by P. C. Spencer, M. D. Petersburg, Virginia.

Stethoscope, vol. i. p. 228, 1851.

Statistical Table of Cases of Retro-Pharyngeal Abscess, with the Means of Treatment, &c., by Charles M. Allin, M. D. New York.

New York Journ. Med., vol. vii. N. S. p. 307, 1851.

Remarks on Tumors, with Cases, by James Bryan, M. D. Phila.

New York Journ. Med., vol. viii. N. S. p. 205, 1852.

Cases of Polypus Laryngitis, by Willard Parker, M. D. New York. Reported by Stephen Smith, M. D., New York.

New York Journ. Med., vol. viii. N. S. p. 15, 1852.

Extirpation (successful) of Enlargement of Isthmus of Thyroid Gland, by George A. Otis, M. D. Richmond.

Virginia Med. and Surg. Journ., vol. ii. p. 115, 1853.

Cystic Goitre (treated by incision and tents, not cured at last account), by Joseph Paneoast, M. D. Philadelphia.

Philadelphia Med. Examiner, vol. vii. N. S. p. 501, 1853.

Case of Hydrocele of the Neck, by D. Gilbert, M. D. Philad.

Med. Examiner, vol. ix. N. S. p. 220, 1853.

ON LIGATURE OF THE ARTERIA INNOMINATA AND CAROTID ARTERIES.

Case of Ligature of the Innominata (the Ligature separated on the fourteenth day, and on the twenty-sixth day the patient was attacked with Hemorrhage, and died), by Valentine Mott, M. D. New York, May 11, 1818.

New York Med. and Surg. Register, p. 9, 1818; also *Eclect. Repert. and Analyt. Review*, vol. ix. p. 1, 1819.

Case of Aneurism of the right Subclavian, in which a Ligature was applied to the Innominata (patient died on the fifth day), by Richard Wilmot Hall, M. D. Baltimore.

Baltimore Med. and Surg. Journ., vol. i. p. 125, 1833.

Case of Carotid Aneurism, cured by an Operation, by Wright Post, M. D. (being the first operation successfully performed on this artery in the United States.) Communicated by V. Mott, M. D. New York.

Transact. of the New York Phys. Med. Soc., vol. i. p. 367, 1817.

Surgical Anatomy of the Arteries, with Rules for the Ligatures of all of them, by George McClellan, M. D. Philadelphia.

Am. Med. Recorder, vol. iii. p. 25, 1820.

Case of Ligature of the Carotid Artery (cured), by R. D. Mussey, M. D. Hanover, New Hampshire.

New England Journ. of Med. and Surg., vol. xi. p. 369, 1822.

Case of Ligature of the Carotid Artery, for Aneurism (successful), by James Sykes, M. D. Dover, Delaware.

Philadelphia Journ. of Med. and Phys. Sciences, vol. vi. p. 139, 1823.

A new Instrument for tying Deep-seated Arteries, by Alexander E. Hosack, M. D. New York.

New York Med. and Phys. Journ., vol. iii. p. 334, 1824.

Case of Fatal Hemorrhage occurring six weeks after the Ligation of the Carotid Artery, by J. W. Cusack, M. D.

Med. Recorder, vol. vii. p. 104, 1824.

Account of a Case, in which both Carotids were tied successfully at the interval of one month after the first Ligation, by Dr. McGill, Maryland. Account furnished by J. Kearny Rodgers, M. D. New York.

New York Med. and Phys. Journ., vol. iv. p. 576, 1825.

A Case of Ligation of the Carotid (died), by Mason F. Cogswell, M. D. Hartford, Connecticut.

New England Journ. of Med. and Surg., vol. xiii. p. 357, 1824.

Three Cases of Ligation of the Carotid Artery, successfully performed on Children of five, eleven, and sixteen years of age, by George McClellan, M. D. Philadelphia.

New York Med. and Phys. Journ., vol. v. p. 523, 1826.

Case of an Operation for Carotid Aneurism (cured), by John C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. i. p. 42, 1823.

Case of an Operation for Carotid Aneurism (cured), by Winslow Lewis, M. D. Boston.

Boston Med. and Surg. Journ., vol. ii. p. 371, 1829.

Aneurism of the Arteria Innominata, involving the Subclavian and the Root of the Carotid; successfully treated by tying the Carotid, by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. v. p. 297, 1829;

also *Maryland Med. Recorder*, vol. i. p. 455, 1829.

Case of Ligation of the Carotid, in 1825, for Fungus of the Antrum (died), by Michael A. Finley, M. D. Williamsport, Maryland.

Maryland Med. Record., vol. i. p. 97, 1829.

Case of Aneurism by Anastomosis, in which both Primitive Carotids were tied (at 2 days interval, successfully, but did not arrest the aneurism), by R. D. Mussey, M. D. New Hampshire.

Am. Journ. Med. Sciences, vol. v. p. 316, 1829;

also *Maryland Med. Recorder*, vol. i. p. 543, 1829.

Case of Ligation of the Carotid, for Anastomosing Aneurism, in a Child three months old (cured), by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. vii. p. 271, 1830; also vol. v. p. 255, 1830.

Description of the Circulation of the Head and Neck, in a Case in which one Carotid had been tied, by Valentine Mott, M.D. New York.

Am. Journ. Med. Sciences, vol. viii. p. 45, 1831.

Case of Telangiectasis of Cheek, cured by Ligature of the Common Carotid, by George Bushe, M. D. New York.

New York Medico-Chirurgical Bulletin, vol. i. p. 53, 1832.

Case of Ligature of the Common Carotid (in a court-room), for attempted Suicide, by William E. Horner, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. x. p. 403, 1832.

Case of Aneurism of the Carotid, treated by Puncture with a Cataract-needle, heated to a white heat (in 1826), by George Bushe, M. D. New York.

Medico-Chirurgical Bulletin, vol. ii. p. 209, 1832.

Ligature of both Carotid Arteries simultaneously (died in twenty-four hours), by Valentine Mott, M. D. New York. Reported by Dr. Vachè.

Am. Journ. Med. Sciences, vol. xiv. p. 530, 1834.

Case of Ligation of both Carotids (successful), by R. D. Mussey, M. D. Fairfield, New York.

Am. Journ. Med. Sciences, vol. xxi. p. 397, 1837.

Case of Gunshot Wound of the Face and Neck; Ligature of Carotid (cured), by Dr. Twitchell, New Hampshire.

Am. Journ. Med. Sciences, vol. v. N. S. p. 510, 1843; also *New England Quarterly Journal Med. and Surg.*, Oct. 1842.

Case of Subcutaneous Erectile Tumor of the Cheek; Ligature of Common Carotid Artery (death from phlebitis and pus between meninges of the brain), by A. C. Post, M. D. New York.

Am. Journ. Med. Sciences, vol. x. N. S. p. 539, 1845; also *N. Y. Journ. Med.*, Sept. 1845.

Case of Gunshot Wound, Secondary Hemorrhage, Ligature of both Carotids at an interval of four and a half days (cured), by John Ellis, M. D. Michigan.

Am. Journ. Med. Sciences, vol. x. N. S. p. 534, 1845; also *New York Journ. Med.*, Sept. 1845.

Case of Ligature of the Carotid Artery for Fungous Tumor of the Neck (died), by George C. Blackman, M. D. New York.

Am. Journ. Med. Sciences, vol. x. N. S. p. 331, 1845.

Ligature (successful) of both Carotids (at an interval of near five weeks), for a remarkable Erectile Tumor of the Mouth, Face, and Neck, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 281, 1846.

Case of Ligature of Common Carotid for removal of the Parotid Gland (successful), by A. B. Shipman, M. D. Illinois.

Am. Journ. Med. Sciences, vol. xiv. N. S. p. 264, 1847.

Case of Ligature of the Primitive Carotid Artery (cured), by H. F. Campbell, M. D. Georgia.

Am. Journ. Med. Sciences, vol. xiv. N. S. p. 542, 1847; also *Southern Med. and Surg. Journ.*, August, 1847.

Case of Ligature of the Carotid Artery, followed by Hemorrhage, and Recovery, by G. Hayward, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxxvi. p. 449, 1847.

✓ Statistics of the Mortality following the Operation of tying the Carotid Arteries and Arteria Innominata, by George W. Norris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xiv. N. S. p. 13, 1847.

Ligature of both Primitive Carotids (successful), by George C. Blackman, M. D. New York.

Am. Journ. Med. Sciences, vol. xv. N. S. p. 357, 1848.

Statistics of Large Surgical Operations (performed in private practice), by Usher Parsons, M. D. Rhode Island.

Am. Journ. Med. Sciences, vol. xv. N. S. p. 359, 1848.

Case of Ligature of the Common Carotid (in two cases, both died), by John P. Mettauer, M. D. Virginia.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 348, 1849.

Case of Wound of the External Carotid—Ligature to Common Carotid (result unknown), by E. Geddings, M. D. Charleston.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 550, 1849.

Case of Ligature of the Primitive Carotid Artery, below the Omo-Hyoid Muscle (cured), by George Fox, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 381, 1849.

Case of Wound of the External Carotid, in which a Ligature was applied to the Common Carotid, by E. H. Deas, M. D. South Carolina.

Charleston Med. Journ., vol. iv. p. 585, 1849.

Case of Ligature of the Principal Carotid (successful), by Paul F. Eve, M. D. Georgia.

Southern Med. and Surg. Journ., vol. vi. p. 210, 1850.

Ligature of the Carotid Artery in Epilepsy (three years after operation, patient as bad as ever), by C. Morrogh, M. D. New Brunswick, N. J.

N. Y. Journ. Med., vol. viii. N. S. p. 419, 1852.

Aneurismal Tumors upon the Ear successfully treated by Ligature of both Carotids (at four weeks' interval, patient etherized), by R. D. Mussey, M.D. Cincinnati.

Ohio Med. and Surg. Journ., vol. vi. p. 125, 1853.

ON LIGATURE OF THE SUBCLAVIAN AND AXILLARY ARTERIES.

Observations relative to the Ligature of the Subclavian Artery (recommending a new Aneurismal Needle, since designated as the Philadelphia Needle, with a drawing), by Joseph Parrish, M. D. Philadelphia.

Eclectic Rept. and Analyt. Review, vol. iii. p. 229, 1813.

Ligature of the Axillary Artery (cured), by Thomas Hubbard, M. D. Pomfret, Connecticut.

New England Journ. of Med. and Surg., vol. iv. p. 211, 1815.

Case of Brachial Aneurism cured by tying the Subclavian Artery above the Clavicle, by Wright Post, M. D. New York.

Transact. Phys. Med. Society of New York, vol. i. p. 387, 1817.

Ligature of the Subclavian Artery for Axillary Aneurism (cured), by Benjamin W. Dudley, M. D. Lexington, Ky., 1825.

Transylr. Journ. Med., vol. ii. p. 363, 1829.

Remarkable Spontaneous Cure of Aneurism, with Observations on Obliteration of Arteries, by William Darrach, M. D. Philadelphia.

Phila. Med. and Phys. Journ. vol. xiii. p. 115, 1826.

Case of Axillary Aneurism (from the reduction of an old luxation), in which the Subclavian Artery was tied (died), by William Gibson, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. ii. p. 136, 1828:

Case of Axillary Aneurism removed by the application of a Ligature to the Subclavian Artery (cured), by Edward W. Wells, M. D. Communicated by Felix Pascalis, M. D. New York.

Am. Journ. Med. Sciences, vol. iii. p. 28, 1828.

Case of Axillary Aneurism, in which the Subclavian was successfully secured by a Ligature, by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. vii. p. 309, 1830.

Case of Aneurism of the Right Subclavian Artery, in which that vessel was tied within the Scaleni Muscles (died on the eighteenth day), by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. xii. p. 354, 1833.

Case of Ligature of the Left Subclavian (successfully performed), by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. xiv. p. 530, 1834.

Case of successful Ligature of the Subclavian, by G. H. White, M.D. Hudson, N. Y.

Am. Journ. Med. Sciences, vol. xxiii. p. 351, 1839.

Case of Axillary Aneurism—Ligature of the Subclavian (above the Clavicle), death on the thirty-first day, by S. D. Gross, M. D. Louisville.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 517, 1841.

Case of Wound of the Axillary Artery and Plexus of Nerves, Amputation below the Shoulder, Secondary Hemorrhage, Ligature of the Subclavian (successful), by Alfred C. Post M.D. New York.

Am. Journ. Med. Sciences, vol. x. N. S. p. 263, 1845; also *New York Journ.*

Med. and Collat. Sciences, March, 1845.

A Table, showing the Mortality following the Operations of tying the Subclavian Artery, by G. W. Norris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. x. N. S. p. 13, 1845.

Case of Ligature of the Subclavian Artery, between the Scaleni Muscles, attended with some Peculiar Circumstances (cured), by John C. Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 539, 1846; also *Med. Times*.
Dec. 6, 1845.

Case of Ligature of the Left Subclavian within the Scaleni Muscles (died), by J. Kearny Rodgers, M.D. New York.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 541, 1846; also *New York Journ.*
of Med., March, 1846.

Case of Ligature of the Left Subclavian Artery, for Subclavian Aneurism (cured), Ligature remaining ninety-six days, with a Remarkable Deviation of the Vessel and Consequent Change of its Relations, by J. Mason Warren, M.D. Boston.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 13, 1849.

Notice of the Anatomical Phenomena, in a Case of Ligature of the Subclavian Artery, four years subsequent to the Operation (showing collateral circulation, &c.), by F. S. Ainsworth, M. D. Boston.

Am. Journ. Med. Sciences, vol. xix. N. S. p. 83, 1850.

Ligature of Left Subclavian Artery, external to Scalenus Muscle (cured), by Valentine Mott, M. D. New York. Reported by John O'Reilly, M.D.

N. Y. Journ. Med., vol. v. N. S. p. 16, 1851.

Subclavian Aneurism successfully treated by Ligature of the Left Subclavian Artery, with an Account of the Appearances on Dissection, a year subsequently (being the result of the case of ligature of this artery reported in 1849), by J. Mason Warren, M.D. Boston.

Am. Journ. Med. Sciences, vol. xxi. N. S. p. 53, 1851.

Case of Ligature of the Subclavian Artery, with Statistical Data, by Wm. H. Van Buren, M.D. New York.

Trans. Med. Soc. of New York, p. 27, 1853.

ON REMOVAL OF THE CLAVICLE.

Exsection of the entire Clavicle, in 1813, by Charles McCreary, M.D. Hartford, Ky. (This was the first operation of the kind in the United States, though it was not published till 1850.) The patient lived 35 years subsequently, and had a useful limb.

History of Kentucky Surgery, p. 180, 1853.

An Account of a Case of Osteo-Sarcoma of the Left Clavicle, in which Exsection of that Bone (entire) was successfully performed, by Valentine Mott, M.D. New York.

This was the first case published, though the second performed.

Am. Journ. Med. Sciences, vol. iii. p. 100, 1828.

Case of Removal of the Clavicle in a State of Osteo-Sarcoma (died on the fourth week), by John C. Warren, M.D. Boston.

Am. Journ. Med. Sciences, vol. xiii. p. 17, 1833.

Case of Complete Removal of the Clavicle (for Caries), by A. J. Wedderburn, M.D. New Orleans.

New Orleans Monthly Med. Register, vol. ii. p. 1, 1852.

OPERATIONS ON THE BREAST.

On Cancer of the Breast, by Joseph Parrish, M.D. Philadelphia.

North American Med. and Surg. Journ., vol. vi. p. 293, 1828.

History of a Case of Sarcomatous Tumor of the Mamma, extirpated by N. Hitt, M.D. Vincennes, Indiana.

Transylvania Journ. of Med., vol. iv. p. 508, 1831.

Case of Cancerous Breast, with partial Ossification of that Organ, by John Maclellan, M.D. Greencastle.

Am. Journ. Med. Sciences, vol. xiii. p. 277, 1833.

Amputation of the Breast for Scirrhus (during etherization—healed readily—disease returned in nine months), by Henry H. Smith, M.D. Philadelphia.

Phila. Med. Examiner, vol. vii. p. 33, 1851.

Amputation of Breast for Scirrhus (during etherization—healed readily—disease returned in thirteen months), by Henry H. Smith, M.D. Philadelphia.

Phila. Med. Examiner, vol. vii. N. S. p. 236, 1851.

Removal of Breast (successful, but no subsequent history), by Jos. Pancoast, M.D. Philadelphia.

Phila. Med. Examiner, vol. vii. N. S. p. 249, 1851.

Medullary Sarcoma of the Right Breast (amputation—Tumor weighed four and a half pounds—died fifty-seven days subsequently), by Carter P. Johnson, M.D. Richmond, Va.

Stethoscope, vol. i. p. 139, 1851.

ON TUMORS OF THE CHEST.

Case of Enormous Steatoma, removed from the Side, by J. M. Foltz, M.D., U. S. N.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 358, 1846.

A Case of Congenital Encysted Tumor of the Right Side of the Chest, successfully treated, with the Seton, by S. D. Gross, M.D. Louisville.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 22, 1849.

Statistics of twelve Cases of Fungus Hæmatodes of the Trunk, Mamma, Face, and Extremities, in which seven were operated upon, and five benefited probably, by Paul F. Eve, M.D. Georgia.

Southern Med. and Surg. Journ., vol. vi. p. 577, 1850.

OPERATIONS ON THE CHEST.

Case of Extensive Caries of the Fifth and Sixth Ribs, and Disorganization of the greater part (about two pounds) of the Right Lung, with a Description of the Operation for the same (being its removal, patient living several months subsequently), by Milton Antony, M.D. Augusta, Georgia. (With a Certificate from John Pugsley, M.D., of Jefferson County, Georgia.)

Phila. Journ. Med. and Phys. Sciences, vol. vi. p. 108, 1823.

Escape of all the Intestines through a Hole in the Diaphragm into the Right Side of the Thorax, by Edward Cornell, M. D. Coventry, Chenango County, New York.

Am. Med. Record, vol. viii. p. 236, 1825.

On the Pathology of Bones, with a Case of successful Removal of Carious Ribs, by H. McDowall, M. D. Fincastle, Virginia.

Am. Med. Record, vol. xiii. p. 98, 1828.

Operation of the Trephine for the Removal of a Portion of Carious Sternum, by Abner Hopton, M. D. North Carolina.

Am. Journ. Med. Sciences, vol. v. p. 545, 1829.

An Account of a successful Operation for the Excision of the Ossified Cartilages, and Anterior Extremities of two Carious Ribs, and the Lower Portion of the Sternum (the patient lived twenty years subsequently), by George McClellan, M. D. Philadelphia.

Western Journ. of the Med. and Phys. Sciences, vol. iv. p. 479, 1831; also

A Report, by J. H. B. McClellan, M. D., *Med. Examiner*, vol. vi. N. S. p. 75, 1850.

Two Cases of Excision of the Ribs (successful), by John C. Warren, M. D. Boston.

Boston Med. Journ., vol. xvi. p. 201, 1837.

ON EMPYEMA.

Operation for Empyema—Excision of a Piece of the Lung, as large as a Nutmeg (cured), by Isaac Rand, Esq., Vice-President of the Massachusetts Medical Society. May, 1783.

Med. Communications and Dissertations of Mass. Med. Soc., vol. i. p. 69, 1790.

Case of Paracentesis Thoracis (cured), by Charles Hall, M. D., of Swanton, Vermont.

New York Med. Repository, vol. xx. p. 36, 1820.

Case of Paracentesis Thoracis, life prolonged, by Lemuel W. Briggs, M. D. Bristol, Rhode Island.

New England Journ. of Med. and Surg., vol. ix. p. 223, 1820.

Case of Empyema successfully treated by Paracentesis Thoracis, by Dr. Craven, of Harrisonburg, Virginia.

Am. Med. Record, vol. vii. p. 363, 1824.

Case of Effusion into the Chest, in which Paracentesis Thoracis was performed (died), by Samuel Jackson, M. D. Philadelphia.

Phila. Journ. Med. and Phys. Sciences, vol. x. p. 119, 1825.

Case of Empyema (cured by Paracentesis), by A. S. Sheldon, M.D. Broome County, New York.

Am. Med. Record, vol. ix. p. 273, 1826.

History of a Case of Empyema, from protracted Measles and Pleurisy, in which the Operation of Paracentesis gave immediate Relief, by Samuel Merriwether, M.D. Indiana.

Western Journ. Med. and Phys. Sciences, vol. iii. p. 65, 1830.

Paracentesis, successfully performed, for Empyema, by Dr. Wolfley. Lancaster, Ohio.

Maryland Med. Record, vol. ii. p. 56, 1832.

Case of Empyema cured by an Operation, by J. Pancoast, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xiii. p. 93, 1833.

Case of Empyema, successfully treated by an Operation (Paracentesis Thoracis), by W. C. Sneed, M.D. Kentucky.

Am. Journ. Med. Sciences, vol. x. N. S. p. 538, 1845.

Case of Gunshot Wound of the Chest, the thick Linen Patch, with which the Ball was enveloped, remaining in the Left Lung twenty years, by M. H. Houston, M.D. Virginia.

Am. Journ. Med. Sciences, vol. ix. N. S. p. 342, 1845.

Case of Empyema, in which Paracentesis Thoracis failed from a cause not generally noticed (a membrane, lining the Pleura Costalis, being pushed before the instrument, and not opened), by John A. Swett, M.D. New York.

Am. Journ. Med. Sciences, vol. xiii. p. 518, 1847; also *New York Journ. of Med.*, January, 1847.

Case of Paracentesis Thoracis for Abscess in the Lungs (Vomica), Recovery, by S. Howard Dickson, M.D. Mecklenburg, Tenn.

Charleston Med. Journ., vol. vi. p. 667, 1851.

Case of Empyema, with Remarks especially in reference to Paracentesis (recommending it), by Wm. Pepper, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 38, 1852.

Three Cases of Paracentesis Thoracis (performed by means of the exploring trocar and suction apparatus), by Dr. Bowditch. Boston.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 103, 1852.

Paracentesis Thoracis (successful) in a Case of Acute Pleurisy, by Dr. Williams. Boston.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 112, 1852.

On the Necessity of Paracentesis Thoracis in Pleuritic Effusion, by Henry J. Bowditch, M.D. Boston.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 320, 1852.

Cases (four) of Paracentesis Thoracis (by the trocar of Schuh), by Jno. T. Metcalfe, M.D. New York.

New York Med. Times, vol. ii. p. 337, 1853.

Paracentesis Thoracis performed on a Child, seven years of age, for Pleuritic Effusion—Rapid Recovery, by Wm. A. Tracy, M.D. New Hampshire.

New York Journ. Med., vol. xi. p. 353, 1853.

ON OPERATIONS OF THE ABDOMEN.

Case of Incision of the Intestines, and Removal of a Silver Tea-spoon which had been swallowed (cured), by Samuel White, M.D. Hudson, New York.

New York Med. Repository, vol. x. p. 367, 1807.

Case of Evacuation of Water from the Abdomen by the Umbilicus (with a proposal to tap at that point), by Samuel Agnew, M.D. Harrisburg.

Philadelphia Med. Museum, vol. i. N.S. p. 159, 1811.

A Remarkable Case of Encysted Dropsy and Paracentesis Abdominis (635 pounds being drawn off in eleven months), by Dr. Amos Holbrook. Milton, Massachusetts.

Med. Communications and Dissertations of Mass. Med. Soc., vol. ii. p. 29, Boston, 1813.

Experiments, to show that the Inflammation which supervenes on the Surface of Wounded Cavities is the Consequence of the Change and Diminution of Temperature caused by the Admission of Air into them, by James Cocke, M.D. Maryland, 1804.

Amer. Med. Record., vol. ii. p. 489, 1819.

Case of a Scirrhus Tumor of the Cæcum, mistaken for an Aneurism of the Right External Iliac Artery, by Theophilus E. Beezley, M.D. Salem, New Jersey.

Phila. Journ. Med. and Phys. Science, vol. vi. p. 350, 1823.

Wound of the Stomach (St. Martin), by Joseph Lovell, Surgeon-General U. S. A.

Am. Med. Record., vol. viii. p. 14, 1825.

Experiments on Digestion (St. Martin), through a Wound in the Stomach, by William Beaumont, M.D. Fort Niagara.

Am. Med. Record., vol. ix. p. 94, 1826.

Case of Excision of a Part of the Spleen (the patient recovered after Peritonitis), by W. B. Powell, M.D. Kentucky.

Am. Journ. Med. Sciences, vol. i. p. 481, 1828.

Case of Penetrating Wound of the Abdomen and Section of the Intestinal Canal, successfully treated on the Plan of Ramsdohr, with Remarks, by Zina Pitcher, M. D., U. S. A.

Am. Journ. Med. Sciences, vol. x. p. 42, 1832.

Case of Hepatic Abscess, in which Tapping was performed before Adhesion of the Liver to the Side had happened, and the Appearances after Death, by Wm. E. Horner, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xiv. p. 83, 1834.

Notes of a Case of Fistulous Opening of the Stomach, successfully treated (by Pressure, &c.), by J. H. Cook, M. D.

Am. Journ. Med. Sciences, vol. xiv. p. 271, 1834.

Case of Abscess of the Liver—Operation and Recovery, by Chas. A. Savery, M. D. Hopkinton, N. Hampshire.

Boston Med. and Surg. Journ., vol. xvii. p. 56, 1837.

Case of Ascites, cured by the Injection of a Stimulating Fluid into the Peritoneal Cavity, by John B. Sherrerd, M. D. New Jersey.

Am. Journ. Med. Sciences, vol. x. N. S. p. 525, 1845.

Case of Removal of seventeen inches of the Small Intestines—Recovery of the Patient, by A. Brigham, M. D. Utica.

Am. Journ. Med. Sciences, vol. ix. N. S. p. 355, 1845.

Case of Gastrotomy (successful), by J. E. Manlove, M. D. Tennessee.

Am. Journ. Med. Sciences, vol. x. N. S. p. 532; also *Boston Med. and Surg. Journ.*, July, 1845.

Sequel to the Case of Removal of seventeen inches of the Intestines, and Recovery of the Patient, by A. Brigham, M. D. Utica.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 44, 1846.

Case of Ascites, in which the Patient was tapped 186 times in ten years, and had 751 $\frac{3}{4}$ gallons of water drawn off, by John H. Griffin, M. D. Virginia.

Am. Journ. Med. Sciences, vol. xix. N. S. p. 401, 1850.

Perforation of Abdomen (four inches long) by fence-rail; intestines protruded, covered with dirt; cleaned and replaced; recovery), by Robert G. Jennings, M. D. Church Hill, Va.

Stethoscope, vol. i. p. 490, 1851.

Case of Ascites, tapped thirty-nine times—Removal of 140 gallons of Fluid, by T. D. Lee, M. D. New York.

New York Journ. Med., vol. v. N. S. p. 50, 1851.

Case of Puncture of the Stomach, with Protrusion of this Organ for six hours (aperture about three-fourths of an inch; nearly the

whole stomach protruded; wound in the stomach closed by fine suture, gently retained near the puncture of the abdomen; water-dressing; cure), by Chas. Wm. Ashby, M.D. Culpepper C. H., Va. *Stethoscope*, vol. i. p. 660, 1851.

On Hydatids of the Liver—Operation—Cure, by J. Edward Weber, M.D. New York.

New York Med. Times, May, 1852.

Three Cases of Ascites cured by Tapping, by Dr. Hayward, Sen. Boston.

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 348, 1852.

Wound of Small Intestines—Recovery (at one part nearly cut in two by a bowie-knife; at another, cut an inch long; closed by glover's stitch with cat-gut; intestine returned; wound in abdomen closed by silk sutures; water-dressing), by L. A. Dugas, M. D. Augusta, Ga.

Southern Med. and Surg. Journ., vol. viii. p. 407, 1852.

Wounded Intestine (treated by suture), with Recovery, by J. J. Chisholm, M. D. Charleston.

Charleston Med. Journ. and Review, vol. viii. p. 615, 1853.

Incised Wound of the Left Side (3 inches long), between the Eighth and Ninth Ribs, followed by Protrusion of the Stomach and Strangulation of the Organ—Reduction, and Recovery of the Patient, by W. W. Hart, M. D. Mississippi.

Western Journ. Med. and Surg., vol. xi. p. 496, 1853.

ON HERNIA.

Case of Strangulated Crural Hernia, operated on according to the method of Don Antonio Gimbernat, with some Observations on the Treatment of Hernia, by Jno. C. Warren, M. D. Boston.

Med. Communications Mass. Med. Society, No. 2, Part 2, p. 44, 1790.

Case of Strangulated Femoral Hernia, where the Operation succeeded after the Obstruction had continued ten days, by John Hahn, M. D. Philadelphia.

Phila. Med. Museum, vol. iv. p. 26, 1808.

Case of Strangulated Hernia, with Observations on the Treatment of Mortified Omentum, by Joseph Parrish, M. D. Philadelphia.

Eclectic Repertory and Analytical Review, vol. i. p. 98, 1811.

Practical Elucidation of the Nature of Hernia, &c., with an Ex-

planation of the Cures of certain Instruments, by G. A. Hull, M. D., late President of the Oncida Medical Society. New York.

New York Med. and Phys. Journ., vol. iv. p. 435, 1825.

Case of Strangulated Umbilical Hernia, cured by an Operation, by T. S. Hewson, M. D. Philadelphia.

Am. Med. Record., vol. xi. p. 106, 1827.

Case of Hernia, in which the Stricture remained at the Mouth of the Sac, after the Intestine was returned by Taxis, by N. Snead, M. D. Virginia.

Transylvania Journ. of Med., vol. ii. p. 525, 1829.

Case of (Inguinal) Hernia (in a man eighty-four years of age), in which there was no evacuation from the Bowels for seventeen days before the Operation (treated successfully), by John J. Abernethy, M. D. Hartford, Connecticut.

Am. Journ. Med. Sciences, vol. xi. p. 31, 1832.

Case of Strangulated Inguinal Hernia, attended with some Peculiarities (Omentum strangulated and forced out by a Cancerous Tumor of the Mesentery), by Horatio G. Jameson, M. D. Baltimore.

Maryland Med. Recorder, vol. iii. p. 54, 1832.

On Congenital Hernia (cured by an Operation), by Alexander H. Stevens, M. D. New York. Reported by Alfred C. Post, M. D. New York.

New York Medico-Chirurgical Bulletin, vol. i. p. 19, 1832.

A Case of Strangulated Inguinal Hernia, successfully treated, by Hunting Sherrill, M. D. Dutchess County, New York.

New York Medico-Chirurgical Bulletin, vol. i. p. 20, 1832.

Case of Strangulated Umbilical Hernia, with Removal of the Cyst, followed by a Radical Cure, by J. W. Heustis, M. D. Mobile.

Am. Journ. Med. Sciences, vol. xvi. p. 380, 1835.

Case of Strangulated Umbilical Hernia in a child seven years old (died), by P. Fahnestock, M. D. Pennsylvania.

Am. Journ. Med. Sciences, vol. xvii. p. 368, 1835.

Cases of Hernia (with Remarks), by Frank H. Hamilton, M. D. Rochester, New York.

Boston Med. and Surg. Journ., vol. xxv. p. 57, 1841.

Of a new Knife for dividing the Stricture in Cases of Strangulated Hernia, by F. Campbell Stewart, M. D. New York.

Am. Journ. Med. Sciences, vol. v. N. S. p. 497, 1843.

Case of successful Operation for Strangulated Femoral Hernia (with two Sacs), by J. Heaton, M. D. Boston.

Boston Med. and Surg. Journ., vol. xxx. p. 35, 1844.

Case of Radical Cure of Hernia, by including the Neck of the Sac and External Ring in a Leadén Ligature, by J. C. Nott, M. D. Mobile.

Am. Journ. Med. Sciences, vol. xiv. N. S. p. 402, 1847.

Case of Strangulated Inguinal Hernia, patient operated on while under the influence of Chloroform (died seven days after the Operation), by James D. Trask, M. D. Whiteplains, New York.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 90, 1849.

Two Cases of Strangulated Hernia, having the Structure in the Neck of the Sac (cured), by T. Wood, M. D. Cincinnati.

Western Lancet, vol. xi. p. 417, 1850.

Inguinal Hernia treated by Injection, by Henry J. Bigelow, M. D. Boston.

Boston Med. and Surg. Journ., vol. xliii. p. 339, 1850.

Reduction of Strangulated Hernia in Mass, by Geo. C. Blackman, M. D. New York.

New York Journ. Med., vol. v. N. S. p. 367, *et supra*, 1850.

Hernia (its radical cure not accomplished by Chase's Truss), by T. Wood, M. D. Cincinnati.

Western Lancet, vol. xii. p. 273, 1851.

Strangulated Hernia—importance of operating early, with Cases (eight), by Alfred Hitchcock, M. D. Fitchburg, Mass.

Boston Med. and Surg. Journ., vol. xlv. p. 89, 1851.

Remarks on Strangulated and Reducible Hernia (showing results of attempts to cure radically), by Alden March, M. D. Albany.

Western Lancet, vol. xiii. p. 373, 1852.

Strangulated Crural Hernia, terminating in Artificial Anus, by John C. Clark, M. D. Ohio.

Western Lancet, vol. xii. p. 613, 1852.

A singular Case of Strangulated Hernia (fold of the Intestine and a portion of the Omentum badly strangulated; another large portion of the Omentum not strangulated, but healthy), cured, by Wm. H. Robert, M. D. Orion, Alabama.

Southern Med. and Surg. Journ., vol. viii. p. 533, 1852.

On the Radical Cure of Reducible Hernia by Injection (of Tinct. Canth.), by Jno. Watson, M. D. New York.

New York Journ. Med., vol. ix. N. S. p. 290, 1852.

Case of Strangulated Hernia, presenting a peculiar Difficulty in the Operation (old Hernia, composed of more than 12 inches of the Large Intestine completely agglutinated, congested, and tumefied,

with a hypertrophied and indurated Mesocolon), Recovery, without Fever, by S. N. Harris, M. D. Savannah, Ga.

Charleston Med. Journ., vol. vii. p. 19, 1852.

Strangulated Scrotal Hernia (cured), by Chas. Bell Gibson, M. D. Richmond.

Stethoscope, vol. ii. p. 139, 1852.

Report on the Permanent Cure of Reducible Hernia, by Drs. Hayward, Mason, Warren, and Parkman.

Boston Med. and Surg. Journ., vol. xlviii. p. 79, 1853.

Operations for the Radical Cure of Inguinal Hernia, by Jos. S. Jones, M. D. Boston.

Boston Med. and Surg. Journ., vol. xlviii. p. 510, 1853.

Strangulated, Umbilical Hernia—Operation under Ether, by N. L. Folsom, M. D. New Hampshire.

Boston Med. and Surg. Journ., vol. xlix. p. 317, 1853.

Case of Strangulated Scrotal Hernia (died), of unusual size, on the Left Side—Presence of Cœcum in the Hernial Sac, by Wm. H. Van Buren, M. D. New York.

New York Journ. Med., vol. x. N. S. p. 56, 1853, extracted from *Rep. N. Y. Path. Society*.

Case of Strangulated Inguinal Hernia cured by Operation (under Chloroform), by E. B. Moore, M. D. Boston.

Boston Med. and Surg. Journ., vol. xlvii. p. 525, 1853.

Remarks on an Operation (injection of Oil of Cloves or Tinct. Canth. into the Canal, and immediate application of a Truss, failed in numerous instances, hence prefers a small Seton at the External Ring), by W. H. Robert, M. D. Orion, Alabama.

Southern Med. and Surg. Journ., vol. ix. p. 133, 1853.

ON ARTIFICIAL ANUS.

Two Cases illustrative of an Operation for the Cure of Artificial Anus, by John Rhea Barton, M. D. Philadelphia.

Am. Med. Record., vol. vii. p. 356, 1824.

Case in which a new and peculiar Operation for Artificial Anus was successfully performed in January, 1809, by P. S. Physick, M. D. Drawn up for publication by B. H. Coates, M. D. Philadelphia.

North American Med. and Surg. Journ., vol. ii. p. 269, 1826.

Singular Case of Artificial Anus, successfully treated by George W. Campbell, M.D. Tennessee.

Transylvania Journ. of Med., vol. ii. p. 425, 1829; also *Maryland Med. Recorder*, vol. i. p. 336, 1829.

Account of a successful Operation for Artificial Anus, accomplished by the Aid of a Novel Instrument, and performed by J. R. Lotz, M.D. New Berlin, Pennsylvania. With Observations on the Apparatus, &c., by Reynell Coates, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xviii. p. 367, 1836.

Case of Artificial Anus (at the Umbilicus), by R. G. Wharton, M.D. Mississippi.

Am. Journ. Med. Sciences, vol. vi. N. S. p. 256, 1843.

Case of Operation for Artificial Anus (cured), by J. Mason Warren, M.D. Boston.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 116, 1848.

Amussat's Operation for Artificial Anus, performed by J. M. Bush, M.D. Lexington, Kentucky.

Am. Journ. Med. Sciences, vol. xix. N. S. p. 275, 1850.

ON LIGATURE OF THE ILIAC ARTERIES.

LIGATURE OF THE COMMON ILIAC ARTERIES.

Case of Wound of the Common Iliac Artery, in which that vessel was tied (being the first case known, the patient lived only fifteen days), by William Gibson, M.D. Philadelphia.

Am. Med. Record, vol. iii. p. 185, 1820.

Case of Ligature of the Common Iliac at its origin (cured), by Valentine Mott, M.D.

Philadelphia Journ. of Med. and Phys. Sciences, vol. xiv. p. 176, 1827.

Case of Ligature of Right Common Iliac Artery in a Child six weeks old (died), by George Bushe, M.D. New York.

New York Medico-Chirurgical Bulletin, vol. i. p. 55, 1832.

Ligature of the Primitive Iliac Artery, successfully performed, by Edward Peace, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. v. N. S. p. 269, 1843.

Ligature of the Primitive Iliac Artery (died), by A. J. Wedderburn, M.D. New Orleans.

New Orleans Med. and Surg. Journ., May, 1852.

LIGATURE OF THE INTERNAL ILIAC ARTERY.

Successful Case of Ligature of the Internal Iliac Artery, by S. Pomeroy White, M. D. New York (formerly of Hudson).

Am. Journ. Med. Sciences, vol. i. p. 304, 1827.

Case of Ligature of the Internal Iliac Artery for a Traumatic Aneurism of the Gluteal (died), by H. J. Bigelow, M. D. Boston.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 29, 1849.

Case of Ligature of the Internal Iliac Artery (died), by Gilman Kimball, M. D. Lowell, Massachusetts.

Am. Journ. Med. Sciences, vol. xx. N. S. p. 92, 1850.

LIGATURE OF THE EXTERNAL ILIAC ARTERY.

Ligature of the External Iliac Artery (cured by tying the artery in the pelvis), by John Syng Dorsey, M. D. Philadelphia, August, 1811. (This was the first successful operation reported in the United States, but the seventh ever performed—the six preceding having been done in England, the first being that by Abernethy.)

Eclectic Repert. and Analyt. Review, vol. ii. p. 111, 1811; also *New England Journ. of Med. and Surg.*, vol. i. p. 66, 1812.

A Case of Inguinal Aneurism (successful ligature) of the External Iliac (by means of Physick's needle), by Wright Post, M. D. New York.

Am. Med. and Philosophical Register, vol. iv. p. 443, 1814.

Ligature of the External Iliac Artery, by J. B. Whitridge, M. D. Sackett's Harbor.

New England Journ. of Med. and Surg., vol. iv. p. 318, 1815.

Case of Ligature of the External Iliac for Inguinal Aneurism (cured), by Nathan Smith, M. D., of Yale College.

Philadelphia Journ. Med. and Phys. Sciences, vol. i. p. 415, 1820.

Ligature of the External Iliac, by H. G. Jameson, M. D. Baltimore.

Am. Med. Recorder, vol. v. p. 118, 1822.

Case of Ligature of the External Iliac (cured), by Alexander H. Stevens, M. D. New York.

N. Y. Med. and Phys. Journ., vol. i. p. 112, 1822.

Case of Ligature of the External Iliac (cured), by John C. Warren, M. D. Boston.

New England Journ. of Med. and Surg., vol. xii. p. 225, 1823.

Case of Inguinal Aneurism (in which an Empiric plunged a lancet), reported by John Rhea Barton, M. D. Philadelphia.

Philadelphia Journ. of Med. and Phys. Sciences, vol. i. N. S. p. 127, 1825.

Ligature of the External Iliac (cured), by David L. Rogers, M. D. New York. Communicated by P. Cadwallader, M. D.

Am. Medical Recorder, vol. ix. p. 269, 1826.

Case of Diffused Femoral Aneurism, for which the External Iliac was tied (cured), by Valentine Mott, M. D. New York.

Am. Journ. Med. Sciences, vol. viii. p. 393, 1831.

Case of Aneurism of the External Iliac Artery, treated successfully by tying up the Vessel, by J. Randolph, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. iii. p. 489, 1829; also *North Amer. Med. and Surg. Journ.*, vol. vii. p. 206, 1829.

Case in which the External Iliac Artery was successfully tied, by James C. Hall, M. D. Washington.

Am. Journ. Med. Sciences, vol. x. p. 90, 1832.

Case of Aneurism of the External Iliac Artery, Ligature of this Artery (died), by J. C. Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xix. p. 541, 1836.

Case of Inguinal Aneurism, in which the Right External Iliac Artery was successfully tied, by William H. Ruan, M. D. St. Croix, West Indies.

Am. Journ. Med. Sciences, vol. xviii. p. 43, 1836.

Case of Ligature of the External Iliac Artery (cured; the Ligature coming away on the thirtieth day), by Edward Peace, M. D. Philadelphia.

Med. Examiner, vol. i. N. S. p. 645, 1842; also *Am. Journ. Med. Sciences*, vol. iv. N. S. p. 250, 1842.

Femoral Aneurism, Ligature of the External Iliac, death on the fifth day, by W. Power, M. D. Baltimore.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 511, 1842; also *Maryland Med. and Surg. Journ.*, Sept. 1842.

Ligature of the External Iliac Artery for Aneurism of the Femoral Artery, cured, by J. M. Boling, M. D. Alabama.

Am. Journ. Med. Sciences, vol. vii. N. S. p. 359, 1844.

Ligature of the External Iliac Artery (for Aneurism of the Femoral, died), by A. J. Wedderburn, M. D. New Orleans.

Am. Journ. Med. Sciences, vol. xiii. N. S. p. 249, 1847; also *New Orleans Med. and Surg. Journ.*, Sept. 1846.

Ligature of the External Iliac of one side, and soon after of the

Femoral of opposite Limb (both successful), by C. Bell Gibson, M. D. Baltimore.

Am. Journ. Med. Sciences, vol. xiv. N. S. p. 535, 1847.

Case of true Inguinal Aneurism; attempt at Manual Compression of the External Iliac; subsequent Ligature (cured), by William H. Van Buren, M. D. New York.

New York Journ. Medicine, vol. ii. N. S. p. 168, 1849; also *Am. Journ.*

Med. Sciences, vol. xvii. N. S. p. 540, 1849.

Case of Inguinal Aneurism, Ligature of the External Iliac (cured), by George Fox, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 377, 1849.

Case of Ligature of the External Iliac (patient died), by Dr. Stedman. Reported by S. Parkman, M. D. Boston.

Am. Journ. Med. Sciences, vol. xix. N. S. p. 73, 1850.

Successful Ligature of External Iliac Artery to relieve Secondary Hemorrhage, by Dr. Hastings. San Francisco.

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 564, 1852.

OPERATIONS ON THE BACK.

Gunshot Wound, Ball lodged in the posterior part of the Neck, and subsequently discharged by Stool, by William Hening, M. D., late Surgeon U. S. A.

Eclect. Rept. and Analyt. Review, vol. vii. p. 246, 1817.

On the Use of Caustic Alkali in Tetanus, by Joseph Hartshorne, M. D. Philadelphia.

[The caustic was rubbed firmly on an oval space $2\frac{1}{2}$ inches wide by $1\frac{1}{2}$ inches long, over the cervical vertebræ, and the patient was relieved in less than two hours.]

Eclect. Rept. and Analyt. Review, vol. vii. p. 245, 1817.

Case of Steatomatous Tumor, weighing twenty-five pounds, removed from the upper part of the Back, by J. S. Dorsey, M. D.

The circumference of the neck, or narrowest part of the tumor, was two feet ten inches.

Thickest part vertically, three feet nine inches.

“ “ horizontally, three feet one inch and a half.

“ “ of waist, after removal of tumor, two feet nine inches.

Am. Med. Record., vol. i. p. 400, 1819.

Case of Lumbar Abscess, attended with Artificial Anus at the Groin (opening the colon), by Wm. E. Horner, M. D. Philad.

Phila. Journ. Med. and Phys. Sciences, vol. i. p. 141, 1820.

Case of Gunshot Wound, in which Tetanus was controlled by a Caustic Issue to the Spine, by David M. Reese, M. D. Baltimore.

Am. Med. Record., vol. viii. p. 548, 1825.

Case of Fistula in the Lumbar Region, communicating with the Bladder, by L. Proudfoot, M. D.

Am. Journ. Med. Sciences, vol. i. p. 241, 1827.

Cases in which portions of three Dorsal Vertebrae were removed with partial success for the relief of Paralysis from Fracture, by Alban G. Smith, M. D. Danville, Kentucky.

North American Med. and Surg. Journ., vol. viii. p. 94, 1829.

Case of Fractured Spine, with the removal of depressed Spinous Process, by an Operation (patient died), by David L. Rogers, M. D. New York. (Communicated by S. R. Kirby, M. D.)

Am. Journ. Med. Sciences, vol. xvi. p. 91, 1835.

Case of Division of the Spinal Marrow (by a Chisel accidentally driven in opposite the Spinous Process of the lower Dorsal Vertebrae, causing Paralysis), the patient recovered, by Eli Hurd, M. D. Niagara County, New York.

Am. Journ. Med. Sciences, vol. x. N. S. p. 531, 1845; also *New York Journ. Med.*, Sept., 1845.

ON SPINA BIFIDA.

Three Cases of Spina Bifida successfully treated; two of them by means of Wire Ligatures, and the other by the Knife, by Amasa Trowbridge, M. D., of Watertown, New York.

Boston Med. and Surg. Journ., vol. i. p. 753, 1829.

Case of Spina Bifida, with Remarks (punctured seventy times without bad consequences, but died ultimately of diarrhoea), by Charles Skinner, M. D. North Carolina.

Am. Journ. Med. Sciences, vol. xix. p. 109, 1836.

Case of Spina Bifida (cured, by Punctures and Pressure), by P. H. Hurd, M. D. Oswego.

Boston Med. and Surg. Journ., vol. xviii. p. 109, 1838.

Case of Spina Bifida successfully treated by Repeated Puncture, by Alexander Stevens, M. D. New York.

Am. Journ. Med. Sciences, vol. vi. N. S. p. 527, 1843; also *New York Journ. of Med. and Collateral Sciences*, No. 2.

Case of Spina Bifida treated by Injection of Tincture of Iodine.
by Daniel Brainard, M. D. Chicago.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 262, 1848; also *Ill. and Ind.*
Med. and Surg. Journ., Jan., 1848.

A Case of Spina Bifida of the Occiput (opened by bistoury),
Death, by Richard L. Howard, M. D. Columbus, Ohio.

Ohio Med. and Surg. Journ., vol. v. p. 214, 1853.

PART IV.

PAPERS ON THE GENITO-URINARY ORGANS AND RECTUM.

OPERATIONS ON THE PENIS.

New Method of performing the Operation of Phymosis, by George Bushe, M.D. New York.

N. Y. Medico-Chirurgical Bulletin, vol. i. p. 224, 1832.

Induration and Enlargement of the Penis, with a new Mode of Amputating that Organ, by Thomas L. Ogier, M.D. Charleston.

Am. Journ. Med. Sciences, vol. xviii. p. 382, 1836.

On Amputation of the Penis, by John P. Mettauer, M.D. Virginia.

Boston Med. and Surg. Journ., vol. xvii. p. 197, 1837.

A Case of Imperforate Prepuce, by D. J. C. Cain, M.D. Charleston.

Am. Journ. Med. Sciences, vol. xiii. N. S. p. 521, 1847; also *Southern Journ. of Med. and Pharmacy*, Jan. 1847.

Amputation of the Penis for Cancer (healed readily, but disease reappeared at Pubis in seven months), by Wm. E. Horner, M.D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 99, 1851.

Report of a Case of Phimosis (operated on by Ricord's Operation and serres-fines instead of suture), by Josiah Harris, M.D. Augusta, Georgia.

Southern Med. and Surg. Journ., vol. viii. p. 21, 1852.

ON AFFECTIONS OF THE MALE URETHRA.

Fistula in Perineo, attended with considerable loss of substance, cured by Lunar Caustic, by Wm. E. Horner, M.D. Philadelphia.

Philadelphia Journ. of Med. and Phys. Sciences, vol. ix. p. 141, 1824.

On the Treatment of Strictures of the Urethra by a Perineal Incision, with Cases, by Horatio G. Jameson, M. D. Baltimore.
(First operation in 1820.)

Am. Med. Record., vol. vii. p. 251, 1824.

Description of an Instrument (with a Plate), for dividing Strictures of the Urethra, by E. R. Chew, M. D. Louisiana.

North American Med. and Surg. Journ., vol. v. p. 341, 1828.

Practical Observations on Stricture of the Urethra, by H. G. Jameson, M. D. Baltimore.

Amer. Med. Record., vol. xii. p. 329, 1828.

Case of Stricture of the Urethra (treated by a perineal section), by Horatio G. Jameson, M. D. Baltimore.

Maryland Med. Recorder, vol. i. p. 177, 1829.

Operations for Artificial Urethra (successful), by Jno. C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. ii. p. 321, 1829.

Treatment of Stricture of the Urethra by rapid and free dilatation, by Paul F. Eve, M. D. Georgia.

New York Med. Times, vol. iv. p. 301.

On Hypospadias (with Cases), by George Bushe, M. D. New York.

New York Medico-Chirurgical Bulletin, vol. ii. p. 1, 1832.

Case of Stricture of Urethra strongly simulating Lithiasis, by Nathan R. Smith, M. D. Baltimore.

North American Archives Med. and Surg. Sciences, vol. i. p. 185, 1835.

Complete Suppression of Urine from Obliteration of Membranous portion of Urethra—Puncture of Bladder above the Pubis—Perineum opened and new Urethra formed—cured, by E. Geddings, M. D. Baltimore (now of Charleston).

American Archives Med. and Surg. Sciences, vol. i. p. 31, 1835.

A Case of Stricture of the Urethra cured by bougies of bark of the slippery elm tree, by Wm. Waters, M. D. Maryland.

Am. Journ. Med. Sciences, vol. xxv. p. 321, 1839.

Practical Observations on those Malformations of the Male Urethra and Penis, termed Hypospadias and Epispadias, with an anomalous Case, by John P. Mettauer, M. D. Virginia.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 43, 1842.

Employment of Gutta Percha in the treatment of Strictures, by Henry J. Bigelow, M. D. Boston.

Boston Med. and Surg. Journ., vol. xl. p. 9, 1849.

Case of Impermeable Stricture of the Urethra (operated on through the Perineum—died 19th day, having suffered from hemorrhage), with the suggestion of a new-shaped Catheter, by J. A. Wragg, M. D. Savannah, Georgia.

Charleston Medical Journal, vol. viii. p. 799, 1852.

OPERATIONS ON THE TESTICLE AND CORD.

New Operation (Ligature of Arteries), for Circocoele, cured by H. G. Jameson, M. D. Baltimore.

Am. Med. Record., vol. viii. p. 271, 1825.

Operation for a Tumor of the Scrotum (Omental Hernia cured), by Jno. C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. i. p. 237, 1828.

Case of Sarcocoele successfully treated by tying the Spermatic Artery, by Horatio G. Jameson, M. D. Baltimore.

Maryland Med. Recorder, vol. ii. p. 607, 1831.

Extirpation of the Testes and Penis affected with Cancerous Disease, by J. C. Hall, M. D. Washington.

Am. Journ. Med. Sciences, vol. x. p. 395, 1832.

Extirpation of the Testis; death from Phlebitis, by Nathan R. Smith, M. D. Baltimore.

North American Archives Med. and Surg. Sciences, vol. ii. p. 77, 1835.

On Tubercles of the Testis (Castration, &c.), by Henry H. Smith, M. D. Philadelphia.

Medical Examiner, vol. iii. p. 360, 1840.

Varicocele and Extirpation of the Testis, by F. H. Hamilton, M. D. Rochester, New York.

Boston Med. and Surg. Journ., vol. xxv. p. 153, 1841.

Treatment of Diseases of the Testicle, by Compression, in November, 1803, by P. S. Physick, M. D. Reported by Edward Hartshorne, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. iii. N. S. p. 258, 1842.

Practical Observations on the Radical Treatment of Varicocele, by John Watson, M. D. New York.

Am. Journ. Med. Sciences, vol. x. N. S. p. 316, 1845.

New Operation (Incision and Ligature), for the Radical Cure of Varicocele, performed successfully eight times, by S. D. Gross, M. D. Louisville.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 327, 1848.

Castration of Enlarged and Irritable Testis, by M. G. Delaney, M. D., U.S.N.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 292, 1848.

Extirpation of Left Testicle (etherized, cured), by Wm. E. Horner, M.D. Philadelphia.

Medical Examiner, vol. vii. N. S. p. 33, 1851.

Extirpation of Testis (by Jobert's Operation, bi-valve flap, semi-circular incision, convex downwards so as to insure subsequent escape of pus), by Charles Bell Gibson, M. D. Richmond, Va.

Stethoscope, vol. i. p. 145, 1851.

Ligature of Spermatic Artery for the Cure of Varicocele, by Horace Nelson, M. D. Plattsburg, New York.

Boston Med. and Surg. Journ., vol. xlv. p. 334, 1851.

Removal of Diseased Testes (cured), by R. McSherry, M. D., U.S.N.

Am. Journ. Med. Sciences, vol. xxii. p. 119, 1851.

Case of Congenital Cystic Sarcoma of the left Testicle (extending from near left inguinal ring to near the knee), cured by excision, by D. Gilbert, M. D. Philadelphia.

Philadelphia Med. Examiner, vol. ix. N. S. p. 154, 1853.

ON HYDROCELE.

Hydrocele treated by Injection, by David Hosack, M. D. New York.

New York Medical Repository, vol. i. p. 419, 1797.

Observations on Hydrocele, by B. Winslow Dudley, M. D. Lexington.

Transylvania Journ. of Med., vol. i. p. 268, 1828.

Case of Congenital Hydrocele, tapped by Dr. McComb, with Remarks by George Bushe, M. D. New York.

New York Medico-Chirurgical Bulletin, vol. i. p. 21, 1832.

On Hydrocele, by George Hayward, M. D. Boston.

Boston Med. and Surg. Journ., vol. xix. p. 154, 1839.

Case of Sudden Formation of Hydrocele, unconnected with inflammation of Tunica Vaginalis (operation—cure), by Henry H. Smith, M. D. Philadelphia.

Am. Journ. of Med. Sciences, vol. xiii. N. S. p. 85, 1847.

Large Hydrocele (53 ounces), cured by injection and seton, by Henry H. Smith, M. D. Philadelphia.

Medical Examiner, vol. vii. N. S. p. 175, 1851.

OPERATIONS ON THE BLADDER.

Preternatural Retention of Urine in consequence of external injury. Bladder tapped above the Pubis. Cured. By James Thacher, M.D. Plymouth.

Med. Communications and Dissertations of Mass. Med. Society, vol. i. p. 35, 1790.

Observations on Retention of Urine, by Samuel Anan, M.D. Baltimore.

Maryland Med. Recorder, vol. i. p. 72, 1829.

Laceration of the Urethra from a fall on the perineum; retention of urine (Bladder punctured above the Pubis), died, by Thomas F. Betton, M.D. Philadelphia. (With Observations by Isaac Hays, M.D.)

Am. Journ. Med. Sciences, vol. xix. p. 389, 1836.

Paracentesis of the Bladder, through the Perineum, by N. R. Smith, M.D. Baltimore.

Am. Journ. Med. Sciences, vol. xxiii. p. 63, 1839.

Closure of the Urethra from an Injury of the Perineum; Urine discharged by an Artificial Opening above the Pubes; the Natural Passage restored by an Operation, by Gurdon Buck, Jr., M.D. New York.

Am. Journ. Med. Sciences, vol. viii. N. S. p. 544, 1844; also *New York Journ. of Med.*, Sept. 1844.

Puncture of the Bladder above the Pubis (cured), by Otis F. Manson, M.D. North Carolina.

Stethoscope, vol. i. p. 324, 1851; and *West. Lancet*, vol. xii. p. 509, 1851.

ON LITHOTOMY.

Account of the Successful Application of Cold Water to the Lumbar Region in cases of Calculus, by John Willday, in a Letter to Benjamin Rush, M.D. 1788.

Transactions of the Philadelphia College of Physicians, vol. i. p. 76, 1793.

An Inaugural Dissertation on Stone in the Bladder (recommending the Use of the Bistoury and Staff, with a Drawing), by Henry U. Onderdonk, M.D. New York.

Am. Med. and Philosoph. Register, vol. i. p. 394, 1811.

Extra-Uterine Fœtus, incrustrated with Calculous Matter, extracted by the Operation of Lithotomy, by Joseph Bossuet, M.D. Hingham, Mass.

New England Journ. Med. and Surg., vol. vi. p. 135, 1817.

Lithotomy Forceps (made with a fenestrum so as to permit the grasping of a large calculus without the extreme separation of the handles of the instrument), by John Rhea Barton, M.D. Philad.

Philadelphia Journ. Med. and Phys. Sciences, vol. viii. p. 147, 1824.

Extraction of a Calculus from the Female Bladder, by Dilatation of the Urethra, by Robert Hamilton, M.D.

Am. Med. Record., vol. xi. p. 115, 1827.

Two Cases of Lithotomy (Lateral Operation, both cured), by Lunsford Pitts Yandell, M.D. Lexington.

Transylvania Journ. of Med., vol. i. p. 431, 1828.

Description of a Remarkable Urinary Calculus, by R. D. Mussey, M.D. New Hampshire.

Am. Journ. Med. Sciences, vol. iv. p. 333, 1829.

Case of Lithotomy (Lateral Operation, cured), by Hugh H. Toland, M.D. South Carolina.

Transylvania Journ. Med., vol. iii. p. 139, 1830.

Cases of Lithotomy (Lateral Operation; cured), in which the Stones were dependent on the presence of a spicula of bone in the bladder, by George W. Campbell, M.D. Tennessee.

Transylvania Journ. Med., vol. iii. p. 211, 1830.

Case of Chief-Justice Marshall; Operation of Lithotomy; more than one thousand small Calculi extracted by Philip S. Physick, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. ix. p. 537, 1831.

Case of Stone, in which the Fundus of the Bladder was coated with Calculous Incrustations, successfully operated on by Lithotomy, by Amasa Trowbridge, M.D. Watertown, New York.

Am. Journ. Med. Sciences, vol. xi. p. 27, 1832.

On the Bi-lateral Operation for Stone (with Drawings of Instruments recommended for this Operation), by George Bushe, M.D. New York.

New York Medico-Chirurgical Bulletin, vol. i. p. 1, 1832.

Lithotomy and Extraction of a Calculus, measuring nearly twelve inches in circumference, and weighing upwards of seventeen ounces avoirdupois (death, fifth day), by Valentine Mott, M.D. New York.

Am. Journ. Med. Sciences, vol. xiv. p. 530, 1834.

Supplementary Observations on Lithotomy, with a description of the Instruments employed, &c., by N. R. Smith, M. D. Baltimore.
Balt. Med. and Surg. Journ., vol. ii. p. 13, 1834.

Case of Lithotomy in which the healing process was interrupted by the supervention of an Eruptive Disease, by Jno. P. Mettauer, M. D. Virginia.

Boston Med. and Surg. Journ., vol. xii. p. 283, 1835.

Statistical Account of the Cases of Urinary Calculi treated in the Pennsylvania Hospital, from May, 1756, to May, 1835, by Reynell Coates, M. D. Philadelphia. (Sixty-one cases; fifty-two males; seven died.)

Am. Journ. Med. Sciences, vol. xvii. p. 97, 1835.

Case of Lithotomy—Calculi of unusual size (about eight ounces, cured), by Nathan R. Smith, M. D. Baltimore. (This case was the twenty-third operated on, with complete success, by Dr. Smith.)

North Am. Archives Med. and Surg. Sci., vol. i. p. 177, 1835.

Lithotomy—Secondary Hemorrhage on the sixth and eighth days, Pleuritis on the twelfth, cerebral irritation on the sixteenth, and death on the twentieth day, by Nathan R. Smith, M. D. Baltimore.

North Am. Archives Med. and Surg. Sci., vol. i. p. 233, 1835.

Observations on the Operation of Lithotomy, illustrated by cases from the practice of Professor B. W. Dudley, by James M. Bush, M. D. Lexington.

Am. Journ. Med. Sciences, vol. xxi. p. 535, 1837; also *Transylva. Journal of Med.*, vol. x. p. 478, 1837.

Case of Urinary Calculus in a Girl, successfully removed by Lithotomy, by T. D. Mütter, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxi. p. 260, 1837.

Lectures on Lithotomy, with an Account of the Bi-lateral Operation, by Alexander H. Stevens, M. D. New York.

New York Journ. Med., vol. xi. p. 104, 1838.

Remarks on the Propriety and best manner of breaking and extracting large Calculi in the Lateral Operation, by J. C. Nott, M. D. Mobile.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 328, 1842.

Lithotomy; Bi-lateral Operation, with cases, by Paul F. Eve, M. D. Georgia.

Am. Journ. Med. Sciences, vol. vii. N. S. p. 504, 1844.

On the Bi-lateral Operation for Lithotomy, and on Lithotritry in the Female, by John C. Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. viii. N. S. p. 293, 1844.

On a new Form of Director and Gorget, by John P. Mettauer, M.D. Virginia. (With a Drawing.)

Med. Examiner, vol. i. N. S. p. 648, 1845.

Lithotomy and Lithotritry (with an Account of Dr. Dudley's Operations), by J. M. Bush, M.D. Lexington, Kentucky.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 545, 1846; also *Western Lancet*, January, 1846.

Bi-lateral Operation in Lithotomy, by R. D. Mussey, M.D. Cincinnati.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 264, 1846.

Case of Lithotomy in the Female, with Remarks by A. Baker, Jr., M.D. Chenango County, New York.

Transactions of Med. Society, State of New York, vol. vi. p. 133, 1846.

Extraordinary Case of Urinary Calculi, two hundred and twenty-eight in number, by John Kelly, M.D. New York.

Am. Journ. Med. Sciences, vol. xiii. N. S. p. 246, 1847.

Lithotomy in a Child two years and eleven months old—Patient under influence of Chloroform (cured), by Frank H. Hamilton, M.D. Buffalo.

Buffalo Med. Journ., vol. iv. p. 735, 1849.

Lithotomy in an Adult under the influence of Chloroform (death in two weeks from Purulent Absorption), by Frank H. Hamilton, M.D. Buffalo.

Buffalo Med. Journ., vol. iv. p. 736, 1849.

Lithotomy (Bi-lateral Operation), in a Boy ten years old, Calculus weighing 3xxv—Attacked with Dysentery ninth day (died), by Paul F. Eve, M.D. Georgia.

Southern Med. and Surg. Journ., vol. v. p. 596, 1849.

Case of Lithotomy in a Child (four years old, cut by the Bi-lateral Section), Anæsthesia (Ether), died forty-five hours after the Operation, by James R. Wood, M.D. New York.

New York Journ. Med., vol. ii. N. S. p. 326, 1849.

Lithotomy—One hundred and seventeen Calculi, weighing four and a half ounces, successfully removed by Paul F. Eve, M.D. Georgia.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 539, 1849; also *Southern Med. and Surg. Journ.*, March, 1849.

Results of fifteen Operations for Lithotomy, by P. C. Spencer, M.D. Petersburg.

Am. Journ. Med. Sciences, vol. xx. N. S. p. 103, 1850.

Stone in the Bladder, weighing eight ounces—Unpleasant Anchy-

losis of the Hip—Successful Bi-lateral Operation, by Charles A. Pope, M. D. St. Louis.

St. Louis Med. and Surg. Journ., vol. vii. N. S. p. 298, 1850.

Calculus in a Child seven years of age (weight of Calculus one ounce, length one inch and seven-tenths, greatest circumference four inches and seven-tenths)—Lithotomy—Recovery, by F. M. Robertson, M. D. Charleston.

Charleston Med. Journ., vol. vi. p. 50, 1851.

Lithotomy—(Calculus, Phosphate of Ammonia and Magnesia; weight two ounces and seventeen grains)—Recovery, by Henry H. Smith, M. D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 235, 1851.

A Case of Double Lithotomy (died in eighty-three hours; first lateral incision, then high operation, owing to the size of the Calculus; weight nearly six ounces, length three inches, longitudinal circumference seven inches, width two inches, lateral circumference five and three-fourth inches), by Wm. J. Johnson, M. D. Fort Gaines, Georgia.

Southern Med. and Surg. Journ., vol. vii. p. 727, 1851.

Lithotomy (Bi-lateral Operation; cured), by Henry F. Campbell, M. D. Augusta, Georgia.

Southern Med. and Surg. Journ., vol. vii. p. 393, 1851.

Removal of an ounce and a half of Calculous Matter from the Bladder by Lithotomy (Bi-lateral Section; three Stones), by Henry F. Campbell, M. D. Augusta, Georgia.

Southern Med. and Surg. Journ., vol. vii. p. 459, 1851.

Two Cases of Lithotomy (cured; Chloroform; Lateral Operation by N. R. Smith's Beaked Knife), by Carter P. Johnson, M. D. Richmond.

Stethoscope, vol. i. p. 656, 1851.

Lithotomy successfully performed on a Boy aged seven (chloroformized and bi-lateral section), by Wm. Nephew King, M. D. Roswell, Georgia.

Southern Med. and Surg. Journ., vol. vii. p. 663, 1851.

Lithotomy—Bi-lateral Operation with the Double Lithotome of Dupuytren (cured), by Jno. Fred. May, M. D. Washington.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 407, 1852.

Lithotomy in a Female four years old (died), by Jno. Fred. May, M. D. Washington.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 411, 1852.

Report of twenty-five Cases of Urinary Calculus, in twenty-three

of which the Bi-lateral Operation was performed, by Paul F. Eve, M.D. Nashville.

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 41, 1852.

Operations for the removal of Calculi in the Urethra, by D. W. Hammond, M.D. Georgia.

Southern Med. and Surg. Journ., vol. viii. p. 654, 1852.

Summary of twenty-five Cases of Urinary Calculi, in twenty-three of which the Bi-lateral Operation was performed (twenty-one recovered), by Paul F. Eve, M.D. Nashville.

New York Journ. Med., vol. ix. N. S. p. 292, 1852, from *Nashville Journ. Med.*

Operation of Lithotomy (cured; Lateral Incision), by Alden March, M.D. Albany.

Western Lancet, vol. xiii. p. 660, 1852.

Lithotomy in a Child eight years of age, successful under etherization, by Henry H. Smith, M.D. Philadelphia.

Med. Examiner, vol. viii. N. S. p. 224, 1852.

Lithotomy (successful; Lateral Operation; Beaked Knife; two Stones, each an ounce and a half), by Richard L. Howard, M.D. Columbus, Ohio.

Ohio Med. and Surg. Journ., vol. iv. p. 290, 1852.

Two Cases of Lithotomy (Lateral Operation; cured), by Richard L. Howard, M.D. Columbus, Ohio.

Ohio Med. and Surg. Journ., vol. iv. p. 371, 1852.

Three Cases of Foreign Bodies introduced into the Bladder, which were removed by the Operation of Lithotomy, reported by Amasa Trowbridge, M.D. Watertown, New York.

New York Med. Gazette, vol. iv. p. 289, 1853.

Case of Lithotomy (Chloroform; Calculus five ounces; died on the nineteenth day), by M. L. Leider, M.D. Ohio.

Western Lancet, vol. xiv. p. 666, 1853.

Cases of Lithotomy (three, operated on by the bi-lateral method and Chloroform; two cured, one died), by L. A. Dugas, M.D. Augusta, Georgia.

Southern Med. and Surg. Journ., vol. ix. p. 82, 1853.

Stone in the Bladder, Lithotritry, Cystitis, &c.—Lithotomy, successful, by Wm. H. Van Buren, M.D. New York.

New York Med. Times, vol. ii. p. 369, 1853.

ON LITHOTRIPSY.

Lithotripsy successfully performed by L. Depeyre, M.D. New York. (October, 1830. First successful Case in the United States.)

North American Med. and Surg. Journ., vol. xi. p. 492, 1831.

Successful Lithotritry, by Alban G. Smith, M.D. Danville, Kentucky.

North American Med. and Surg. Journ., vol. xii. p. 256, 1831.

Lithotritry, successfully performed by P. S. Spencer, M.D. Virginia.

Am. Journ. Med. Sciences, vol. xii. p. 554, 1833.

Lithotripsy, successfully performed in six Cases, by J. Randolph, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xv. p. 13, 1834.

Removal of Calculi from the Urethra, by means of a Wire Loop attached to a Silver Bougie, by A. Leander Uttery, M.D. Providence.

Boston Med. and Surg. Journ., vol. xii. p. 237, 1835.

Case of Urinary Calculus, in which Dr. J. Randolph successfully performed Lithotripsy, by Isaac Hays, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xvii. p. 258, 1835.

Sketch of Lithotripsy, with Cases, by William Gibson, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xviii. p. 338, 1836.

Seven additional Cases of Stone in the Bladder, successfully treated by Lithotripsy, by J. Randolph, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xix. p. 52, 1836.

Report of four additional Cases of Stone in the Bladder, successfully treated by Lithotripsy, by J. Randolph, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxi. p. 13, 1837.

Report of Cases of Lithotripsy, by N. R. Smith, M.D. Baltimore.

Am. Journ. Med. Sciences, vol. xxi. p. 25, 1837.

Cases of Lithotritry performed by J. Randolph, M.D. Reported by A. E. Stocker, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 263, 1846.

Four Cases of Lithotripsy, performed by J. Randolph, M.D. (Two on Children, aged four years.) Reported by J. M. Wallace, M.D. Philadelphia.

Medical Examiner, vol. v. N. S. p. 288, 1849.

Lithotripsy and Lithotomy, with the Use of Ether in those Operations, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 47, 1849.

Two Cases of Lithotripsy, by the late George McClellan, M. D., in one of which the male blade of Heurteloup's instrument broke in the Bladder, and was subsequently passed by the Urethra. Reported by J. H. B. McClellan, M. D. Philadelphia.

Med. Examiner, vol. v. N. S. p. 513, 1849.

Removal of three inches of a Gum Elastic Catheter by means of Heurteloup's Instrument, by J. H. Dillson, M. D. Pittsburg.

Am. Journ. Med. Sciences, vol. xx. N. S. p. 268, 1850.

Lithotripsy, successfully performed by Wm. E. Horner, M. D. Philadelphia.

Medical Examiner, vol. vii. N. S. p. 97, 1851.

Lithotripsy in the Female (cured), by J. Deane, M. D. Greenfield, Massachusetts.

Boston Med. and Surg. Journ., vol. xlv. p. 20, 1852.

OPERATIONS ON THE EXTERNAL ORGANS OF THE FEMALE.

Case of Imperforate Hymen (patient married for two years before the operation relieved her), by J. W. Horton, M. D. Maryland.

Maryland Med. Recorder, vol. i. p. 408, 1829.

Case of Fistulous Communication between the Vagina, Bladder, and Rectum, by Charles Byrne, M. D., U. S. Army.

Am. Journ. Med. Sciences, vol. vi. p. 70, 1830.

Observations on Sanguineous Tumors of the Vagina, by Hugh H. Toland, M. D. South Carolina.

Transylvania Journ. of Med., vol. vii. p. 204, 1834.

Fungus Hæmatodes (in Recto-Vaginal Septum; extirpation; cure), by N. R. Smith, M. D. Baltimore.

Am. Archives Med. and Surg. Sci., vol. i. p. 37, 1835.

Case of Medullary Sarcoma of the Labia, &c., by A. B. Shipman, M. D. New York.

Am. Journ. Med. Sciences, vol. v. N. S. p. 368, 1843.

A Case of Imperforate Hymen, by William Shultice, M. D. Virginia.

Am. Journ. Med. Sciences, vol. vii. N. S. p. 243, 1844.

Case of Imperforate Hymen, by John G. Metcalf, M. D. Massachusetts.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 139, 1846.

Vaginal Hysterotomy and subsequent Delivery with the Forceps, with safety to both Mother and Child, by G. S. Bedford, M. D. New York.

Am. Journ. Med. Sciences, vol. xv. N. S. p. 348, 1848.

A previous successful Case of the same.

New York Journal of Medicine, March, 1843.

Vaginal Hysterotomy (successful to Mother), by John H. Griffin, M. D. Virginia.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 94, 1849.

On Occlusion of the Vagina (operation by incision and dilatation, relieved), by H. J. Holmes, M. D. Mississippi.

Ohio Med. and Surg. Journ., vol. ii. p. 540, 1850.

OPERATIONS ON THE FEMALE PERINEUM.

Parturient Laceration of the Recto-Vaginal Septum, successfully treated with Metallic Ligatures, by John P. Mettauer, M. D. Virginia.

Am. Journ. Med. Sciences, vol. xiii. p. 113, 1833.

Extirpation of the Os Coccygis for Neuralgia, by J. C. Nott, M. D. Mobile.

Am. Journ. Med. Sciences, vol. viii. N. S. p. 544, 1844.

Hints on the Treatment of Lacerated Perineum, by Wm. E. Horner, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xx. N. S. p. 329, 1850.

OPERATIONS ON THE VAGINA.

Non-Existence of the Vagina remedied by an Operation, by John C. Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xiii. p. 79, 1833.

Case of Vesico-Vaginal Fistula, successfully treated by an Operation, by George Hayward, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxiv. p. 283, 1839.

Recto-Vaginal Fistula (cured), by J. Rhea Barton, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. i. N. S. p. 305, 1840.

On Vesico-Vaginal Fistula, by John P. Mettauer, M.D. Virginia.
Am. Journ. Med. Sciences, vol. xiv. N. S. p. 117, 1847.

Vesico-Vaginal Fistula, treated by the ordinary Hare-lip Operation (relieved), by Henry H. Smith, M. D. Philadelphia.

Med. Examiner, vol. v. N. S. p. 155, 1849.

Case of Imperforate Vagina and Malformation of the Superior Portion. Operation (cure), by A. B. Shipman, M. D. Indiana.

Am. Journ. Med. Sciences, vol. xviii. p. 401, 1849.

Case of Procidentia Uteri—Successful Operation (diminishing the orifice of the Vagina), by J. R. Wood, M. D. New York.

New York Med. Times, vol. i. p. 41, 1851.

Cases of Vesico-Vaginal Fistula, treated by Operation, by George Hayward, M. D. Boston.

Boston Med. and Surg. Journ., vol. xlv. p. 209, 1851.

Three Cases of Occlusion of the Vagina, accompanied by retention of the Catamenia, relieved by an Operation, by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxii. N. S. p. 13, 1851.

Occlusion of the Vagina—Operation—Death (in three days, from Peritonitis, though the Peritoneum was not opened), by Jno. O. Stone. New York.

New York Journ. Med., vol. vi. N. S. p. 289, 1851.

Case of Vesico-Vaginal Fistula (cured by an Operation), by Prof. Pancoast. Reported by C. D. Meigs, M. D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 650, 1851.

Case of Constricted Vagina and Occlusion of the Os Uteri (punctured; died), by Lawrence Turnbull, M. D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 696, 1851.

Occlusion of the Vagina—Successful Operation (excision of Cica-trix), followed by Conception and Delivery, by P. C. Spencer, M. D. Petersburg, Va.

Stethoscope, vol. i. p. 209, 1851.

On the Treatment of Vesico-Vaginal Fistula, by J. Marion Sims, M. D. Alabama.

Am. Journ. Med. Sciences, vol. xxiii. p. 59, 1852.

Almost complete Occlusion of the Vagina, cured by an Operation, by Dr. Hayward, Sen. Boston.

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 350, 1852.

Cases of Complete Occlusion of the Vagina (one treated by incision, &c., but contracting, notwithstanding every effort to prevent it), by Valentine Mott, M. D. New York.

New York Med. Times, vol. ii. p. 1, 1852.

Three Cases of Occlusion of the Vagina, relieved by an Operation, by J. Mason Warren, M.D. Boston.

Am. Journ. Med. Sciences, vol. xxv. N. S. p. 86, 1853.

Recto-Vaginal Fistula (cured; clamp suture), by R. D. Mussey, M.D. Cincinnati.

Ohio Med. and Surg. Journ., vol. vi. p. 127, 1853.

Case of Atresia Vagina, by O. H. Taylor, M.D. Camden, N. J.

New Jersey Med. Reporter, vol. vi. p. 439, 1853.

Occlusion of the Vagina—Conception (Operation), by T. L. Ogier, M.D. Charleston.

Charleston Med. Journ., vol. viii. p. 811, 1853.

A Case of Atresia Vagina (Operation unsuccessful, the parts contracting after incision, notwithstanding the employment of dilatation), by D. E. Ewart, M.D. South Carolina.

Charleston Med. and Surg. Journ., vol. viii. p. 81, 1853.

A Case of Congenital Occlusion of the Vagina relieved by an Operation (puncture and laceration), by Geo. L. Upshur, M.D. Norfolk, Va.

Med. Examiner, vol. ix. N. S. p. 523, 1853.

OPERATIONS ON THE UTERUS.

Amputation of the Cervix Uteri for Scirrhus (died), by H. G. Jameson M.D. Baltimore.

Am. Med. Record., vol. vii. p. 543, 1824.

Case of successful Excision of the Cervix Uteri in a Scirrhus State, by John B. Strachn, M.D. Virginia.

Am. Journ. Med. Sciences, vol. v. p. 307, 1829.

Extirpation of a Cancer of the Uterus (died sixth day), by John C. Warren, M.D. Boston.

Am. Journ. Med. Sciences, vol. iv. p. 536, 1829.

Uterine Tumor removed by an Operation (died), by Moses Hibbard, M.D. New Hampshire.

Boston Med. and Surg. Journ., vol. viii. p. 68, 1833.

Complete Extirpation of the Uterus by Ligature, after Chronic Inversion of the Organ (successful), by John M. Esselman, M.D. Nashville.

Am. Journ. Med. Sciences, vol. vii. N. S. p. 254, 1844.

Case of Extirpation of a Fibrous Tumor by the large Peritoneal Section, by Washington L. Atlee, M.D. Pennsylvania.

Am. Journ. Med. Sciences, vol. viii. N. S. p. 539, 1844.

Case of successful Extirpation of a Fibrous Tumor from the surface of the Uterus by the large Peritoneal Section, by Washington L. Atlee, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. ix. N. S. p. 309, 1845.

Amputation of the Neck of the Uterus, by N. J. McL. Moore, M.D. New Hampshire.

Boston Med. and Surg. Journ., Dec. vol. xxxvii. p. 397, 1847.

Excision of the Cervix Uteri for Carcinomatous Disease (died), by Washington L. Atlee, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 86, 1848.

A Sarcomatous Tumor, containing Hair and Stearine, removed from the Womb, by Gunning S. Bedford, M.D. New York.

New York Journ. of Medicine, vol. ii. N. S. p. 30, 1849.

Case of Excision of the Uterus (died three months after the operation), by Paul F. Eve, M.D. Georgia.

Am. Journ. Med. Sciences, vol. xx. N. S. p. 395, 1850.

An Eclectic Essay on the Non-Pediculated Fibro-Scirrhus Tumors of the Uterus, by Wm. C. Roberts, M.D. New York.

New York Journ. of Medicine, vol. iii. N. S. p. 330, 1849; also *Ibid.*, vol. iv. N. S. p. 31, 1850.

Amputation of Uterus (successful) after Partial Inversion, by Usher Parsons, M.D. Providence, Rhode Island.

Boston Med. and Surg. Journ., vol. xlv. p. 511, 1852.

Removal of a Fibrous Tumor from the Uterus, including a portion of the Cervix Uteri (cured), by T. L. Ogier, M.D. Charleston.

Charleston Med. Journ., vol. vii. p. 154, 1852.

Occluded Os Tincæ—Operation (puncture by Trocar), by A. Barclay, M.D. Newburgh, New York.

American Lancet, vol. viii. p. 37, 1853.

ON POLYPUS UTERI.

Cases of Uterine Polypus treated by Ligatures, by Thomas Chadbourn, M.D. New York.

Boston Med. and Surg. Journ., vol. xxi. p. 289, 1839.

Polypus Uteri, removed by Excision, by C. R. Gilman, M.D. New York.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 519, 1841.

Cases of Uterine Polypus (new Instrument for Ligature), by John V. P. Quackenbush, M.D. Albany.

Am. Journ. Med. Sciences, vol. vii. N. S. p. 241, 1844.

Polypus and Inversion of Uterus; Ligature, Excision of a large portion of the Uterus (recovery), by A. L. Peirson, M. D. Salem, Mass.

Am. Journ. Med. Sciences, vol. xvii. p. 339, 1849.

Case of Polypus Uteri, successfully removed by Ligature, by S. B. Philips, M. D. New York.

New York Journ. Med. and Collateral Sciences, vol. iv. N. S. p. 199, 1850.

Case of Polypus of the Uterus, successfully removed, by S. B. Phillips, M. D. New York.

New York Journ. Med., vol. iv. N. S. p. 348, 1850.

Polypus Uteri (cured, by double Canula), by Robert G. Jennings, M. D. Virginia.

Stethoscope, vol. i. p. 491, 1851.

Polypus of the Uterus (cured by Ligature, with Gooch's double Canula), by A. Fattaway, M. D. Georgia.

Southern Med. and Surg. Journ., vol. viii. p. 532, 1852.

Case of Polypus Uteri (successfully removed with the double Canula and Ligature, by Jno. P. Mettauer, M. D. Winchester, Va.

Stethoscope, vol. ii. p. 8, 1852.

ON OVARIOTOMY AND GASTROTOMY.

Three Cases of Extirpation of the Ovaria, successfully performed, by Ephraim McDowell, M. D. Kentucky, 1809. (This operation was the first of the kind ever performed. The operation of Dr. Houstoun, of Scotland, in 1701, and reported by Dr. Atlee (*Am. Journ. Med. Sciences*, vol. xvii. N. S.) was merely the evacuation of an ovarian dropsy, there being no proof of the removal of the tumor, though his puncture was enlarged to five inches. L'Aumonier's operation, generally thought to have been the first, was also only the evacuation of an abscess of the ovary.) (See Gross's *History of Kentucky Surgery*.)

Eclectic Report. and Analyt. Review, vol. vii. p. 242, 1817.

On Ovarian Disease and Abdominal Steatoma, by Thomas Henderson, M. D. Georgetown, D. C.

Eclectic Report., vol. viii. p. 545, 1818.

Observations and Cases (two), of removal of Ovaria, by Ephraim McDowell, M. D. Danville, Kentucky.

Eclectic Report., vol. ix. p. 546, 1819.

Case of Ovarian Tumor, successfully removed by an Incision through the Abdomen, by Nathan Smith, M. D. July 5, 1820. Yale College.

Am. Medical Recorder, vol. v. p. 124, 1822.

Case of Extirpation of Ovarian Sacs for the cure of Hydrops Ovarii (died), by Joseph A. Gallup, M. D. Vermont.

New England Journ. of Med. and Surg., vol. xiv. p. 358, 1825.

Account of a Case of successful removal of a Diseased Ovarium, by Alban G. Smith, M. D. Danville, Kentucky.

North American Med. and Surg. Journ., vol. i. p. 30, 1826.

Case of Ovarian Tumor, successfully extirpated, by David L. Rogers, M. D. New York.

New York Med. and Phys. Journ., vol. ii. N. S. p. 285, 1830; also *Am.*

Journ. Med. Sciences, vol. v. p. 549, 1829.

Contributions to Ovarian Pathology, by E. Geddings, M. D., Baltimore.

North Amer. Archives Med. and Surg. Journ., vol. i. p. 111, 1835.

Successful Operation for Ovarian Disease, Adhesion of Wall of Vagina, &c., by R. D. Mussey, M. D. Fairfield, New York.

Am. Journ. Med. Sciences, vol. xxi. p. 377, 1837.

Case of successful Peritoneal Section for the removal of two Diseased Ovaria, &c., by John L. Atlee, M. D. Lancaster.

Am. Journ. Med. Sciences, vol. vii. N. S. p. 44, 1844.

Case of Congenital Tumor (of the Abdomen) composed of numerous Cysts, by Washington L. Atlee, M. D. Pennsylvania.

Am. Journ. Med. Sciences, vol. vii. N. S. p. 84, 1844.

Extirpation of a Bi-ocular Ovarian Cyst by the large Peritoneal Section, by Washington L. Atlee, M. D. Lancaster.

Am. Journ. Med. Sciences, vol. viii. N. S. p. 43, 1844.

Extra-Uterine Foetation, Gastrotomy, successfully performed ten years after Conception, by Alexander H. Stevens, M. D. New York.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 279, 1846; also *New York Journ. of Med.*, May, 1846.

Case of Extra-Uterine Pregnancy (cured by Gastrotomy), by Edward Whinery, M. D. Iowa.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 351, 1846.

Removal of an Extra-Uterine Foetus, fifteen years in cavity of Abdomen (through the Rectum), and complete recovery, by Thomas Yardley, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 348, 1846.

Extirpation of a peculiar form of Uterine Tumor, simulating Ovarian Disease, by the large Peritoneal Section (died), by Samuel Parkman, M. D. Boston.

Am. Journ. Med. Sciences, vol. xv. N. S. p. 371, 1848.

Extirpation of a Diseased Ovary, by Daniel Meeker, M. D. Indiana.

Boston Med. and Surg. Journ., vol. xxxix. p. 116, 1848.

Ovarium, successfully removed, by H. Miller, M. D. Louisville.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 528, 1848.

Gastrotomy (for a Uterine Tumor which could not be removed), recovery, by J. Deane, M. D. Greenfield.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 258, 1849; also *Boston*

Med. and Surg. Journ., vol. xxxix. p. 221, 1848.

Ovarian Dropsy cured by the long Abdominal Section in 1701, by Robert Houstoun. Glasgow, Scotland. Reported by Washington L. Atlee, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 534, 1849.

Case of successful Extirpation of an Ovarian Tumor by the large Peritoneal Section, by Washington L. Atlee, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 336, 1849.

Solid Ovarian Tumor, extending from the Pubis to the Right Hypochondrium, cured by Incision followed by Suppuration, by David Prince, M. D. St. Louis.

Am. Journ. Med. Sciences, vol. xx. N. S. p. 267, 1850.

Account of an Operation for the removal of an Ovarian Tumor, by Alden March, M. D. Albany.

Transactions of New York Med. Society, vol. viii. p. 201, 1850;

also *New York Journ. Med.*, vol. v. N. S. p. 140, 1850.

Fibrous Tumor of the Left Ovarium successfully removed by the large Abdominal Section, by Wm. H. Van Buren, M. D. New York.

Am. Journ. Med. Sciences, vol. xx. N. S. p. 272, 1850; also *New York Journ. Med.*, March, 1850.

Two Cases of Ovariectomy (with Statistics), by Washington L. Atlee, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xix. N. S. p. 318, 1850.

Ovariectomy, three Cases, by P. J. Buckner, M. D. Georgetown, Ohio.

Am. Journ. Med. Sciences, vol. xx. N. S. p. 560, 1850; also *Ohio Med. and Surg. Journ.*, vol. iii. p. 1, 1850.

Ovarian Dropsy—removal of the Sac (large section) and fatal termination, by A. H. Grimshaw, M. D. Delaware.

Med. Examiner, vol. vi. N. S. p. 630, 1850.

Gastrotomy successfully performed for Extra-Uterine Conception (right tubal), by M. Franklin Brown, M. D. Hanibal, Missouri.

St. Louis Med. and Surg. Journ., vol. vii. p. 205, 1850.

A Table of all the known Operations of Ovariectomy, comprising 222 Cases, &c., by Washington L. Atlee, M. D. Philadelphia.

Transactions Am. Med. Association, vol. iv. 1851.

Double Ovarian Dropsy (both Ovaries successfully removed by the large peritoneal section), by E. R. Peaslee, M. D. New York.

[This case, it is believed, is unique; both ovaries being successfully removed at the same operation. The catamenia appeared 72 hours after operation; they had been seen 10 days before.]

Am. Journ. Med. Sciences, vol. xxi. p. 371, 1851.

Case of Ovarian Dropsy (Ovariectomy successfully performed), by A. Dunlap, M. D. Ripley, Ohio.

Western Lancet, vol. xii. p. 355, 1851.

Gastrotomy successfully performed in a Case of Extra-Uterine Pregnancy (patient under chloroform—foetus in right Fallopian tube—size of 7 months—weight about 5 pounds), by Drs. Bradley and Rogers, Pineville, Alabama.

Western Lancet, vol. xii. p. 520, 1851.

From *New Orleans Med. and Surg. Journ.*

Ovarian Tumor removed, per vias naturales, by Catheterism of the Fallopian Tubes, by Samuel A. Cartwright, M. D. New Orleans.

Stethoscope, vol. i. p. 414, 1851.

From *New Orleans Med. and Surg. Journ.*

Attempted removal of an Ovarian Cyst by the small abdominal section—unsuccessful from the absence of a pedicle (patient well, two months subsequently), by S. Parkman, M. D. Boston.

Boston Med. and Surg. Journ., vol. xlv. p. 421, 1851.

Ovariectomy (large section, died), by James Deane, M. D. Mass.

Boston Med. and Surg. Journ., vol. xlv. p. 474, 1851.

Ovarian Dropsy cured by a simple operation (adhesion of the sac to the abdominal parietes being produced by external irritation; the incision was made near the linea semi-lunaris—the tumor tapped and the canula kept in till a purulent discharge ensued—it was then removed and the fluid left to discharge naturally), by Jno. Douglass, M. D. Chester District, South Carolina.

Charleston Med. Journ., vol. vi. p. 669, 1851.

Ovariectomy successfully performed (for a multilocular cyst), by Ezra P. Bennett, M. D. Connecticut.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 282, 1852.

A very large Mesenteric Tumor—simulating Ovarian disease—successfully extirpated, by P. J. Buckner, M. D. Cincinnati.

Am. Journ. Med. Sciences, vol. xxiv. N. S. p. 358, 1852.

Removal of an Ovarian Tumor by the large Abdominal Section; death from Peritonitis, by Wm. H. Van Buren, M. D. New York.

New York Journ. Med., vol. viii. N. S. p. 212, 1852.

Ovariectomy (performed under chloroform—died), by Ezra P. Bennett, M. D. Danbury, Connecticut.

New York Journ. Med., vol. viii. N. S. p. 288, 1852.

Ovariectomy (death on 14th day of general Dropsy), by D. D. Franklin, M. D. Tiffin, Ohio.

Eclectic Med. Journal, vol. iv. p. 355, 1852.

Case of Ovariectomy (for first 18 days did well, then took cold, and died one month afterwards of Peritonitis), by Samuel Gross, M. D. Louisville.

Western Journ. of Med. and Surg., vol. xi. 3d series, p. 39, 1853.

Ovarian Tumor removed (successfully—large section), by D. McRuer, M. D. Bangor, Maine.

Boston Med. and Surg. Journ., vol. xlviii. p. 74, 1853.

Removal of an Ovarian Tumor (died of hemorrhage 20½ hours after operation), by G. W. Bayless, M. D. Haslewood, Missouri.

St. Louis Med. and Surg. Journ., vol. xi. p. 204, 1853.

Ovariectomy by a new method (dividing the peritoneum around the pedicle before applying the ligature), cured, by Richard L. Howard, M. D. Columbus, Ohio.

Ohio Med. and Surg. Journ., vol. v. p. 211, 1853.

Ovariectomy (adhesions), died 17th day after operation, by Richard L. Howard, M. D. Columbus, Ohio.

Ohio Med. and Surg. Journ., vol. v. p. 213, 1853.

ON THE CÆSAREAN OPERATION.

Cæsarean Operation, successfully performed by John L. Richmond, M. D. Ohio. (Done without assistance at 1 A. M. with Instruments from a pocket-case.)

West. Journ. of Med. and Phys. Sciences, vol. iii. p. 485, 1830.

Observations on the Cæsarean Operation (accompanied by an Account of the Operation of Dr. Wm. Gibson), in which both Mother and Child were preserved, by Joseph G. Nancrede, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xvi. p. 343, 1835.

Case where the Cæsarean Section was performed with a fatal termination, by A. Brooke, M.D.

Am. Journ. Med. Sciences, vol. xviii. p. 258, 1836.

Account of a Case in which the Cæsarean Section, performed by Professor W. Gibson, was a second time successful in saving both Mother and Child, by George Fox, M.D.

Am. Journ. Med. Sciences, vol. xxii. p. 13, 1838.

Cæsarean Section on a Dwarf, by Cyrus Falconer, M.D.

Am. Journ. Med. Sciences, vol. vi. N. S. p. 264, 1843; also *Western Journ. of Med. and Surg.*, May, 1843.

Case of Cæsarean Section (successful), by Brodie S. Herndon, M.D. Virginia.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 386, 1846.

Cæsarean Operation (performed unsuccessfully), by A. B. Shipman, M.D. Indiana.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 122, 1849.

Cæsarean Section successfully performed by Dr. Gorham, Louisiana.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 283; from *New Orleans Med. and Surg. Journ.*, Sept., 1851.

ON AFFECTIONS OF THE RECTUM.

Fistula in Ano in an Infant, eight months old, cured by Incision, by Felix Pascalis, M.D. New York.

Philadelphia Med. Museum, vol. vi. p. 197, 1809.

Stricture of Rectum, successfully treated by an operation, by H. G. Jameson, M.D. Baltimore.

Am. Med. Record, vol. v. p. 290, 1822.

Improved Mode of Operating for Hemorrhoids, by J. C. Rousseau, M.D. Philadelphia.

Am. Med. Record., vol. ix. p. 288, 1825.

Fissure of the Rectum, attended with Constriction of the Anus, cured by division of the Sphincter Ani, by Alexander H. Stevens, M.D.

New York Med. and Phys. Journ., vol. iv. p. 242, 1825.

Case of Prolapsus Ani, in which the entire Rectum was successfully extirpated, by J. W. Brite, M.D. New Castle, Kentucky.

Am. Med. Record, vol. x. p. 311, 1826.

Case of Blind Hemorrhoids, cured by Use of Setons, by Ransom M. Collins, M.D. Louisiana.

Transylvania Med. Journ. vol. ii. p. 139, 1829.

Callous Stricture of Rectum (died), by Daniel King, M.D. Charlestown, Rhode Island.

Boston Med. and Surg. Journ., vol. iii. p. 525, 1830.

Case of Prolapsus Recti, successfully treated by excision, by J. W. Heustis, M.D. Alabama.

Am. Journ. Med. Sciences, vol. xi. p. 411, 1832.

New Instrument for Fistula in Ano, by T. D. Mütter, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. xiv. p. 80, 1834.

Remarks on the Pathology and Treatment of Hemorrhoidal Tumors, by N. R. Smith, M.D. Baltimore.

North American Archives, vol. ii. p. 10, 1835.

Prolapsus Ani (cured by Ligatures and Needles), by George Hayward, M.D. Boston.

Boston Med. and Surg. Journ., vol. xix. p. 156, 1838.

Remarks on the Treatment of Hemorrhoids (suggesting a new mode of operating), by Wm. E. Horner, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 358, 1842.

On Strictures of the Rectum, by Thomas D. Mütter, M.D. Philadelphia.

Med. Examiner, vol. i. N. S. p. 77, 1845.

Description of a new Operation for Hemorrhoids, by Amussat, translated by Henry Selden, M.D. Virginia.

Am. Journ. Med. Sciences, vol. xi. N. S. p. 346, 1846.

Extraction of a Glass Goblet from the Rectum, by W. S. W. Ruschenberger, M.D., U.S.N.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 409, 1849.

Imperforate Anus (operated on by trocar—child lived 18 months), by J. H. York, M.D. Boston.

Boston Med. and Surg. Journ., vol. xlii. p. 273, 1850.

A Case of Imperforate Anus—operation—failure—remarks on the causes of failure, by John S. Mitchell, M.D. Charleston.

Charleston Med. Journ., vol. v. p. 752, 1850.

Large Hemorrhoids operated on by Dr. Horner's plan (cured), by Henry H. Smith, M. D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 175, 1851.

Fatal Case of Tetanus following Ligature of Hemorrhoids (ether, double ligature passed through tumor by needle), by James Bolton, M. D. Virginia.

Stethoscope, vol. i. p. 662, 1851.

Imperforate Anus; operation; death (rectum closed $1\frac{1}{2}$ inch up by fleshy mass), by A. Bryant Clarke, M. D. Holyoke, Mass.

Boston Med. and Surg. Journ., vol. xlv. p. 100, 1852.

Imperforate Anus, and other Malformation, relieved by an operation, by George Hayward, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxvi. N. S. p. 554, 1853.

From *Virginia Med. and Surg. Journ.*, July, 1853.

Hemorrhoids of 17 years' standing; cured (by ligature and excision), by John McCall, M. D. Utica.

New York Journ. Med., vol. xi. p. 350, 1853.

PART V.

PAPERS RELATING TO OPERATIONS ON THE EXTREMITIES.

GENERAL OPERATIONS ON THE EXTREMITIES.

ON the Arrest of the Progress of Whitlow, by means of Caustic, by Dr. Perkins. Philadelphia.

Am. Medical Record, vol. ii. p. 490, 1819.

Surgical Account of the Naval Battle on Lake Erie (Gunshot Wounds), by Usher Parsons, M.D., U.S.N. (now of Rhode Island.)

Eclectic Repertory, vol. ix. p. 28, 1819.

On the Best Method of Removing Contractions in the Limbs from Burns, by Wm. G. Nice, M.D. Virginia.

Am. Med. Record, vol. iii. p. 341, 1820.

Hydrops Articuli in the Shoulder, by James Kent Platt, M.D. Plattsburg.

Am. Med. Record, vol. iv. p. 209, 1821.

Case in Proof of Efficacy of the Actual Cautery in Deep Sinuses, by N. R. Smith, M.D. Burlington, Vermont.

Philadelphia Journ. of Med. and Phys. Sciences, vol. vi. p. 128, 1823.

Removal of a large indolent Tumor on the Thigh, by the Application of Caustic, by H. G. Jameson, M.D. Baltimore.

Am. Med. Record, vol. vi. p. 59, 1823.

Case of Wounded Nerve from Bleeding in the Forearm just below the Elbow, cured by Division of the Nerve, by T. Nelson, M.D. New York.

New York Med. and Phys. Journ., vol. iii. p. 62, 1824.

An Operation for Inverted Toe-Nail, by John D. Godman, M.D. Philadelphia.

Philadelphia Journ. Med. and Phys. Sciences, vol. iii. p. 338, 1826.

Case of Rupture of the Tendo-Achillis, with an Account of the Method of Treatment, by Wm. E. Horner, M. D. Philadelphia.

Phila. Journ. Med. and Phys. Sciences, vol. xii. p. 407, 1826.

Cases of Neuralgia or Painful Affections of the Nerves from Injury, &c., by Jno. C. Warren, M. D. Boston.

Boston Med. and Surg. Journ., vol. ii. p. 98, 1829.

Case of Diseased Sciatic Nerve, in which the Nerve was removed by Excision (death), by Robert Bayard, M. D. St. John's, New Brunswick.

New York Med. and Phys. Journ., vol. ii. N. S. p. 37, 1830.

Abnormal Elongation of the Tibia consequent on extensive Ulceration of the Leg, by Alexander Baron, M. D. South Carolina.

North American Archives, vol. ii. p. 290, 1834.

An Inquiry into the Pathology and Treatment of Secondary Abscesses, &c., resulting from Injuries and Surgical Operations, by Jno. Watson, M. D. New York.

Am. Journ. Med. Sciences, vol. xxi. p. 17, 1837.

Case of Varicose Veins cured by means of Needles passed through the Veins after the Method proposed by Davat, by Henry H. Smith, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxii. p. 525, 1838.

On the Treatment of Varicose Veins, by Henry H. Smith, M. D. Philadelphia.

Med. Examiner, vol. ii. p. 821, 1839.

On Enlargement of Bursa over the Patella, by George Hayward, M. D. Boston.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 513, 1842; also *New England Quarterly Journal*, July, 1842.

On the Pathology and Treatment of Varices, by John Watson, M. D. New York.

Am. Journ. Med. Sciences, vol. v. N. S. p. 36, 1843.

Adipose Sarcomatous Tumor (removed from lower border of shoulder, over $\frac{1}{2}$ yard in circumference, 10 inches in diameter, and 8 inches in thickness), by M. Stephenson, M. D. New York.

N. Y. Journ. Med., vol. iv. N. S. p. 346, 1850.

Chronic Inflammation and Abscess of Head of Tibia, cured by application of Trephine, by R. McSherry, M. D., U. S. Navy.

Am. Journ. Med. Sciences, vol. xxii. p. 118, 1851.

Cases (Four) of Tetanus cured by the Division of the Injured Nerve, by Moses Sweat, M. D. North Parsonfield, Maine.

New York Med. Journ., vol. vi. N. S. p. 194, 1851.

Paronychia, an Epidemic, by James E. Morgan, M. D. Washington.

Am. Journ. Med. Sciences, vol. xxiii. p. 144, 1852.

Two Cases of Foreign Bodies (cartilages) successfully removed from Knee-joint, by Jno. Fred. May, M. D. Washington.

Am. Journ. Med. Sciences, vol. xxiii. N. S. p. 415, 1852.

Enormous Development of a Steatomatous Tumor (upon the shoulder—weight, 8 pounds), successfully removed, by J. S. Crane, M. D. Columbia, South Carolina.

Charleston Med. Journ., vol. vii. p. 56, 1852.

Successful Removal of a Foreign Body from the Knee-joint, by J. Washington Smith, M. D. Croton, New York.

Med. Examiner, vol. viii. N. S. p. 578, 1852.

ON CLUB-FOOT.

Report of several Cases of Club-Foot successfully treated by dividing the Tendo-Achillis, by W. Detmold, M. D. New York.

Am. Journ. Med. Sciences, vol. xxii. p. 105, 1838; also *Med.*

Examiner, vol. i. p. 198, 1838.

On Division of the Tendo-Achillis in Club-Foot, by James H. Dickson, M. D. New York.

Am. Journ. Med. Sciences, vol. xxii. p. 512, 1838.

Congenital Club-Foot, and Division of the Tendo-Achillis, by G. W. Norris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxiii. p. 257, 1839.

Division of the Tendo-Achillis in Club-Foot, by N. R. Smith, M. D. Baltimore.

Am. Journ. Med. Sciences, vol. xxiii. p. 61, 1839.

Case of Talipes Equinus, cured by Stromeyer's Operation, by James H. Dickson, M. D. New York.

Am. Journ. Med. Sciences, vol. xxiii. p. 96, 1839.

Successful Club-Foot Operations (ten), by A. G. Walton, M. D. Pennsylvania.

Am. Journ. Med. Sciences, vol. xxiii. p. 259, 1839.

Club-Foot Division of Tendo-Achillis, by Thomas J. Garden, M. D. Virginia.

Am. Journ. Med. Sciences, vol. xxiv. p. 257, 1839.

Cases of Deformed Feet treated by Mechanical Means alone, with

a Description of the Apparatus, by Heber Chase, M.D. Philadelphia.

Am. Journ. Med. Sciences, vol. i. N. S. p. 88, 1841.

Club-Foot cured at an Advanced Age, by J. B. Brown, M.D. Boston.

Am. Journ. Med. Sciences, vol. vii. N. S. p. 256, 1844.

Case of Varus (cured by Tenotomy and Apparatus), by John O. Reilly, M.D. New York.

New York Journ. Med., vol. v. N. S. p. 22, 1851.

Case of Double Club-Foot (Varus and Pes Equinus) treated by Tenotomy and a Shoe (cure perfect five years afterwards), by Henry H. Smith, M.D. Philadelphia.

Medical Examiner, vol. vii. N. S. p. 181, 1851.

ON ANEURISMS AND LIGATURE OF ARTERIES IN THE EXTREMITIES.

Aneurism of the Thigh, cured by an Operation (two Ligatures), and Use of the Limb preserved, by Thomas Kast, A.M. Boston.

Communications and Dissertations of Mass. Med. Soc., vol. i. p. 96, 1790.

Case of Varicose Aneurism at the Bend of the Arm, cured by Ligature of the Brachial Artery, by P. S. Physick, M.D. Philadelphia.

Philadelphia Med. Museum, vol. i. p. 65, 1805.

Ligature of the Femoral Artery for a Wound, by John C. Warren, M.D. Boston.

Communications and Dissertations of Mass. Med. Soc., vol. i. p. 40, 1806.

Case of Aneurism of the Femoral Artery (successful), by David Hosack, M.D. New York.

Amer. Med. and Philosophical Register, vol. ii. p. 49, 1811.

Ligature of the Femoral Artery (cured), by David Hosack, M.D. New York.

New York Med. Repository, vol. xii. p. 103, 1809.

Account of a Case of Aneurism of the Femoral Artery, cured (by rest and pressure), by Jos. Parrish, M.D. Philadelphia. (In this paper there is the suggestion of Dr. Physick, to apply pressure by means of a pad and screw, which could be tightened gradually till a cure was effected.)

Eclectic Repertory, vol. i. p. 506, 1811.

Case of Popliteal Aneurism successfully treated by Ligating the Femoral Artery, by Henry U. Onderdonk, M.D. New York.

Am. Med. and Philosoph. Register, vol. iv. p. 44, 1814.

Successful Ligature of the Femoral Artery for a Wound in the Knee-Joint, by Henry U. Onderdonk, M.D. New York.

Am. Med. and Philosoph. Register, vol. iv. p. 176, 1814.

Case of Brachial Aneurism cured by tying the Subclavian Artery above the Clavicle, by Wright Post, M.D. New York. Communicated by J. C. Bliss, M.D.

Transactions of New York Physico-Med. Society, vol. i. p. 367, 1817.

Case of Popliteal Aneurism, &c., by Horatio Gates Jameson, M.D. Baltimore.

Am. Med. Record, vol. iv. p. 94, 1821.

On the Utility of tying large Arteries in preventing Inflammation in Wounds of the principal Joints, with Cases, by David L. Rogers, M.D. New York.

New York Med. and Phys. Journ. vol. iii. p. 453, 1824.

Case of Aneurism of the Brachial Artery cured by Compression, by W. B. Fahnestock, M.D. Pennsylvania.

Phila. Journ. Med. and Phys. Sciences, vol. ii. N. S. p. 363, 1825.

Spontaneous Cure of Aneurism, with Observations on the Obliteration of Arteries, by W. Darrach, M.D. Philadelphia.

Phila. Journ. Med. and Phys. Sciences, vol. iv. N. S. p. 115, 1826.

Case of Femoral Aneurism of the Left Thigh, and Popliteal Aneurism of the Right Leg, successfully treated by Valentine Mott, M.D. (The Femoral was tied first for the Popliteal Aneurism, and the External Iliac fourteen days subsequently, both successful.)

Am. Journ. Med. Sciences, vol. i. p. 483, 1828.

Diffused Aneurism at the Bend of the Arm, produced by puncture with a Lancet in Bleeding, cured by an Operation (opening the Sac and tying the Artery above and below), by Horatio G. Jameson, M.D. Baltimore.

Maryland Med. Recorder, vol. i. p. 460, 1829.

Case of Aneurism of the Brachial Artery, cured by Compression, by J. W. Heustis, M.D. Alabama.

Am. Journ. Med. Sciences, vol. ix. p. 261, 1831.

Pressure applied to the Femoral Artery as a means of curing Popliteal Aneurism (Dec. 1826), by George Bushe, M.D. New York.

Medico-Chirurgical Bulletin, vol. ii. p. 213, 1832.

Wound of the Ulnar Artery at the Heel of the Hand, success-

fully treated by Compression after the Ligature had failed, by H. G. Jameson, M. D. Baltimore.

Maryland Med. Record., vol. iii. p. 40, 1832.

Ligature of the Femoral Artery for Popliteal Aneurism, Hemorrhage from the Femoral on the twelfth day—Second Application of the Ligature above the Profunda, Hemorrhage on the eighth day, arrested by Compression (cured), by N. R. Smith, M. D. Baltimore.

Baltimore Med. and Surg. Journ., vol. ii. p. 61, 1834.

Femoro-Popliteal Aneurism—Spontaneous Cure of the Popliteal by the Occurrence of the Femoral Aneurism—Arteries Diseased—Ligature of the Femoral—Hemorrhage on the eleventh day—Separation of the Ligature on the nineteenth day—Recovery, by Nathan R. Smith, M. D. Baltimore.

North American Archives, vol. ii. p. 75, 1835.

Ligature of the Brachial Artery for Veno-Arterial Aneurism (cured), by Nathan R. Smith, M. D. Baltimore.

North Am. Arch. Med. and Surg. Sci., vol. i. p. 241, 1835.

Two Cases of Aneurism (Femoral and Brachial), exhibiting the necessity of a Ligature both above and below the Tumor, by Wm. E. Horner, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. i. N. S. p. 74, 1841.

Ligature of the Femoral Artery for Popliteal Aneurism, by Jas. Deane, M. D. Massachusetts.

Boston Med. and Surg. Journ., vol. xlix. p. 141, 1853.

Ligature of the Femoral Artery for Popliteal Aneurism (cured), also of the Brachial (cured), by A. W. Shipman, M. D. New York.

Med. Examiner, vol. iv. p. 441, 1841.

Aneurism of the Femoral Artery, showing the importance of applying a Ligature below as well as above the Sac, by Wm. E. Horner, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 332, 1842.

Aneurism of the Femoral Artery from Fracture of the Femur, Ligature of the External Iliac Artery (cured), by Daniel Brainard, M. D. St. Louis.

Am. Journ. Med. Sciences, vol. vi. N. S. p. 359, 1843.

Varicose Aneurism, successfully treated by Pressure, by William Johnston, M. D. New Jersey.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 378, 1846.

Table, showing the Mortality following the Operation of Tying the Iliac Arteries, by G. W. Norris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xiii. N. S. p. 13, 1847.

Popliteal Aneurism, successfully treated by Compression, by J. Knight, M. D. New Haven.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 255, 1848; also *Boston Med. and Surg. Journ.*, vol. xxxviii. p. 293, 1848.

Statistics of the Mortality following the Operation of tying the Femoral Artery, by G. W. Norris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 313, 1849.

Successful Ligature of the Femoral Artery for Wound of the Anterior Tibial, by E. P. Bennett, M. D. Connecticut.

Am. Journ. Med. Sciences, vol. xix. N. S. p. 272, 1850; also *New York Journ. Med.*, vol. iv. N. S. p. 199, 1850.

Ligature of the Femoral Artery for Popliteal Aneurism (successful), by Charles A. Pope, M. D. St. Louis.

St. Louis Med. and Surg. Journ., vol. vii. p. 292, 1850.

Femoral Aneurism cured (in 18 days) by Compression, by W. H. Church, M. D. New York.

New York Journ. Med., vol. vi. N. S. p. 196, 1851.

Two Cases of Popliteal Aneurism successfully treated by Compression, by James R. Wood, M. D. New York.

New York Journ. Med., vol. vi. N. S. p. 304, 1851.

Case of Popliteal Aneurism cured by Compression *over the Tumor*, by H. N. Bennett, M. D. Bethel, Connecticut.

New York Journ. Med., vol. vii. p. 26, 1851.

Popliteal Aneurism successfully treated by Compression (of Femoral Artery—Dupuytren's Instrument), by Wm. H. Van Buren, M. D. New York.

New York Med. Times, vol. i. p. 33, 1851.

Traumatic Aneurism of Posterior Tibial Artery (by shears puncturing six inches below knee); Ligature of Artery; Secondary Hemorrhage; Amputation (cured), by J. H. Brown, M. D. Paris, Maine.

New York Journ. Med., vol. ix. N. S. p. 362, 1852.

Ligature of the Right Femoral Artery for the cure of Elephantiasis Arabicum (cure perfect 16 months after the operation), by J. M. Carnochan, M. D. New York.

N. Y. Journ. Med., vol. ix. N. S. p. 161, 1852.

Deligation (successful) of the Ulnar Artery for Aneurism, by A. J. Crittenden, M. D. Heathsville, Virginia.

Stethoscope, vol. ii. p. 491, 1852.

Ligature of Femoral Artery for Popliteal Aneurism; Recovery, by Daniel Brainard, M. D. Chicago.

Northwest Med. and Surg. Journ., vol. iv. p. 414, 1852.

ON PSEUDARTHROSIS, &c.

Fracture of the Os Humeri, in which, from False Joint, the Cure was effected by means of a Seton, by Philip S. Physick, M. D. Philadelphia. (Operation 18th Dec. 1802.)

Medical Repository, vol. vii. p. 122, 1804.

Two Cases of Tardy Union (Pseudarthrosis) in Fractures, cured by Caustic Issues in Integuments, by Joseph Hartshorne, M. D. Philadelphia.

Eclectic Rept., vol. iii. p. 114, 1813.

Ununited Fracture of the Humerus, cured by Seton, by Robert Thaxter, M. D. Dorchester.

New England Journ. of Med. and Surg., vol. vii. p. 150, 1818.

Case of False Joint, treated by the Seton, by Nicholas Worthington, M. D. District of Columbia.

Philadelphia Journ. of Med. and Phys. Sciences, vol. ii. p. 337, 1821.

The Seton, successfully applied in Pseudarthrosis of the Forearm, by John Baxter, M. D. New York.

Am. Med. Record, vol. vii. p. 30, 1824.

Application of Caustic, and Cure of Pseudarthrosis, by John Rhea Barton, M. D. Philadelphia.

Am. Med. Record, vol. vii. p. 275, 1826.

Ununited Fracture of the Humerus, successfully treated by Resection after Failure of Seton, by J. Kearny Rodgers, M. D. New York.

New York Med. and Phys. Journ., vol. vi. p. 521, 1827.

Mechanism of Preternatural Joints, and Means of Cure, by Thomas T. Hewson, M. D. Philadelphia.

North American Med. and Surg. Journ., vol. v. p. 1, 1828.

Ununited Fracture of the Os Humeri, successfully treated by the Injection of a Stimulating Fluid (sol. cupri sulph.) into the Wound, by Isaac Hulse, M. D., U. S. N.

Am. Journ. Med. Sciences, vol. xiii. p. 374, 1833.

Case of Ununited Fracture, successfully treated by Friction, by Isaac Parrish, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xiv. p. 372, 1834.

Pseudarthrosis of both Bones of the Leg, treated by Excision and Caustic, and again by Resection (failed in both instances from Menorrhagia), by Henry H. Smith, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xv. N. S. p. 84, 1848.

Ununited Fracture of the Femur (of one year's standing), successfully treated by Resection, Denudation, and retaining Ends of Bone by means of Wire, by D. Brainard, M. D. Illinois.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 256, 1849.

Pseudarthrosis of Fore-arm (successful operation of resection and wiring ends of bone), by James M. Smith, M. D. Springfield, Massachusetts.

Boston Med. and Surg. Journ., vol. xlv. p. 123, 1851.

On the Treatment of Pseudarthrosis, by an apparatus (illustrated) which permits the use of the limb and obviates the necessity of amputation (or any operation), by Henry H. Smith, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxi. N. S. p. 106, 1851.

On Pseudarthrosis (with thirteen Cases), by John Watson, M. D. New York.

New York Med. Times, vol. i. p. 1, 1851.

On Treatment of Pseudarthrosis by Subcutaneous Perforation of the Bone (by brad-awls), with a Case, by Daniel Brainard, M. D. Chicago.

Northwest Med. and Surg. Journ., vol. iv. p. 409, 1852.

Case of Ununited Fracture of Tibia of 4 years' standing; cured (by resection), by W. G. Williams, M. D. Chillicothe, Ohio.

Western Journ. Med. and Surg., vol. ix. 3d series, p. 16, 1852.

Resection of the Ununited Ends of a Fractured Femur (fresh ends approximated by a silk ligature passed through them; died thirty hours after operation—chloroformed), by Carter P. Johnson, M. D. Richmond.

Stethoscope, vol. ii. p. 267, 1852; also *Med. Examiner*, vol. vii. N. S. p. 648, 1851.

ON RESECTION OF THE BONES OF THE EXTREMITIES.

Necrosis, two Cases operated on, by John H. Martin, M. D. Maine.

New England Journ. of Med. and Surg., vol. i. p. 162, 1812.

Case of Wounded Shoulder-Joint, in which the Head of the Humerus was removed successfully, by Henry Hunt, M. D. Washington.

Medical Record, vol. i. p. 365, 1818.

Resection of nearly the whole of the Ulna, successfully, by Robert B. Butt, M. D. Virginia.

Philadelphia Journ. of Med. and Phys. Sciences, vol. i. N. S. p. 115, 1825.

Successful Extirpation of the Astragalus after Compound Luxation, by Alexander H. Stevens, M. D.

New York Med. and Phys. Journ., vol. v. p. 560, 1826.

Treatment of Anchylosis of the Hip-Joint by the Formation of an Artificial Joint, a new Operation, devised and executed by John Rhea Barton, M. D. Philadelphia.

North American Med. and Surg. Journ., vol. iii. pp. 279, 400, 1827.

Case of Necrosis, with some peculiarities (sequestrum remaining too long), by Horatio G. Jameson, M. D. Baltimore.

Maryland Med. Recorder, vol. i. p. 463, 1829.

Successful Removal of the Astragalus in Compound Dislocation, by Wm. A. Gillespie, M. D. Virginia.

Am. Journ. Med. Sciences, vol. xii. p. 552, 1833.

Resection of first three Metatarsal and the three Cuneiform Bones—leaving the corresponding toes—cured (patient able to walk well), by E. Geddings, M. D. Baltimore (now of Charleston).

Am. Archives Med. and Surg. Science, vol. i. p. 36, 1835.

Resection of Shaft of Femur for Necrosis and Exostosis succeeding a compound comminuted fracture—cured, by E. Geddings, M. D. Baltimore.

Am. Archives Med. and Surg. Sciences, vol. i. p. 34, 1835.

Resection of the Astragalus (for Necrosis—Removal of the Entire Bone—cured), by N. R. Smith, M. D. Baltimore.

Am. Archives Med. and Surg. Sciences, vol. i. p. 83, 1835.

A Case of Excision of Elbow-Joint (being the first in the United States), by Thomas Harris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xix. p. 341, 1836.

A new Treatment in a Case of Anchylosis of Knee (a V incision), by J. Rhea Barton, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxi. p. 332, 1837.

Successful Operation to remedy a Deformed Fracture of the Leg, by Charles Parry, M. D. Indiana.

Am. Journ. Med. Sciences, vol. xxiv. p. 334, 1839.

Operation for remedying an Anchylosis of the Hip-Joint, by J. Kearny Rodgers, M. D. New York.

Am. Journ. Med. Sciences, vol. i. N. S. p. 507, 1840; also *New York Med. and Surg. Journ.*, Jan. 1840.

Case of Excision of the Elbow-Joint, by Gurdon Buck, Jr., M. D. New York.

Am. Journ. Med. Sciences, vol. ii. N. S. p. 249, 1841; also *New York Med. and Surg. Journ.*, April, 1841.

Case of Complete Anchylosis, in which the Knee-Joint was permanently Flexed, cured by an Operation, by Wm. Gibson, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. iv. N. S. p. 39, 1842.

Deformity from unsuccessfully treated Fracture of Leg, treated by Resection, by John Rhea Barton, M. D. Reported by W. S. Ruschenberger, M. D. Philadelphia.

Med. Examiner, vol. i. N. S. p. 17, 1842.

Case of False Anchylosis of the Knee-Joint treated by mechanical means alone, without the aid of Tenotomy, with a Description of the Apparatus, by Heber Chase, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. iii. N. S. p. 101, 1842.

Excision of the Elbow-Joint (cured), by J. Pancoast, M. D. Philadelphia.

Med. Examiner, vol. i. N. S. p. 609, 1842.

Excision of the Olecranon Process for Anchylosis of the Elbow-Joint, by Gurdon Buck, Jr., M. D. New York.

Am. Journ. Med. Sciences, vol. v. N. S. p. 297, 1843.

Anchylosis of the Knee, successfully treated by Barton's Operation, by J. Platt Burr, M. D. Louisiana.

Am. Journ. Med. Sciences, vol. viii. N. S. p. 270, 1844.

The Knee-Joint Anchylosed at a Right Angle. Restored nearly to a straight position, after the Excision of a wedge-shaped portion of Bone consisting of the Patella, Condyles, and Articulating Surface of the Tibia, by Gurdon Buck, Jr., M. D. New York.

Am. Journ. Med. Sciences, vol. x. N. S. p. 277, 1845.

Removal of a Third of the Head of the Humerus, by N. Pinkney, M. D., U. S. N.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 330, 1846.

Excision of the Elbow-Joint for Caries of the Articular Extremities of the Bones, by Gurdon Buck, Jr., M. D. New York.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 544, 1846.

Resection of Condyles of Humerus for Compound Fracture of the Elbow-Joint—Recovery, with a new Joint, by John O. Stone, M. D. New York.

New York Journ. Med., vol. vi. N. S. p. 300, 1851.

Resection of the middle Two-thirds of the Ulna (cured), by Carter P. Johnson, M.D. Richmond.

Med. Examiner, vol. vii. N. S. p. 644, 1851.

Resection of Femur for Deformed Fracture (during etherization; died four days after operation), by Wm. E. Horner, M.D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 32, 1851.

Resection of Femur above the Knee (Barton's operation), successfully performed by Thos. D. Mütter, M.D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 37, 1851.

Successful Resection (by incision; disarticulation and resection of Condyles of the Femur and head of Tibia), by A. J. Wedderburn, M.D. New Orleans.

Southern Med. and Surg. Journ., vol. viii. p. 443, 1852, from *New Orleans Med. Register*.

Excision of the Scapula for a large Tumor, by S. D. Gross, M.D. Louisville.

Western Journ. of Med. and Surg., vol. xi. p. 419, 1853.

A Case of Femoral Exostosis—with Remarks, by L. A. Dugas, M.D. Georgia.

Southern Med. and Surg. Journ., vol. ix. N. S. p. 718, 1853.

On Pulsating Tumor of Bone (Aneurism of Bone), with Remarks, by Charles D. Smith, M.D. New York.

New York Journ. Med., vol. x. N. S. p. 153, 1853.

Pus within the Shaft of the Tibia—Trepined—Cured, by Dr. Strong, of Boston.

Am. Journ. Med. Sci., vol. xxv. N. S. p. 81, 1853.

ON AMPUTATIONS.

Amputation at the Shoulder, by Jno. Warren, M.D. Boston, 1781. (First in the United States.)

Boston Med. and Surg. Journ., vol. xx. p. 210, 1839.

Amputation of the Arm at the Shoulder, together with the Acromion Process of Scapula for Fungus Hæmatodes after the Ligation of the Subclavian Artery (died), by Wm. C. Bowen, M.D. Providence.

New England Journ. of Med. and Surg., vol. iii. p. 314, 1814.

New Tourniquet, by Francis Moore, M.D. Connecticut.

New England Journ. of Med. and Surg., vol. iv. p. 209, 1815.

Amputation at the Shoulder-Joint (died), by J. B. Whitbridge, M. D. South Carolina.

New England Journ. of Med. and Surg., vol. v. p. 21, 1816.

Amputation of part of the Foot (cured), by George Hayward, M. D. Boston.

New England Journ. of Med. and Surg., vol. v. p. 338, 1816.

Report of extraordinary Cases of Amputation, by Amasa Trowbridge, M. D. Watertown.

New York Med. Repository, vol. xix. p. 20, 1819.

Case of Fungus Hæmatodes, amputated by George McClellan, M. D. Philadelphia.

Am. Med. Record., vol. v. p. 634, 1822.

Remarks on Amputation (with the proposition of a new method of performing the Flap Operation), by Nathan Smith, M. D., of Yale College.

New York Med. and Phys. Journ., vol. iv. p. 303, 1825.

Successful Amputation at the Hip-Joint, by Valentine Mott, M. D. New York.

Phila. Journ. Med. and Phys. Sciences, vol. v. N. S. p. 101, 1827.

Amputation at the Elbow-Joint (Flap, first in the United States, cured), by J. Kearny Rodgers, M. D. New York.

New York Med. and Phys. Journ., vol. vii. p. 85, 1828.

Case of Encephaloid Degeneration (Fungus Hæmatodes) of the Knee and Lower Part of the Thigh, in which Amputation was performed, by E. Geddings, M. D. Baltimore.

Am. Journ. Med. Sciences, vol. xi. p. 17, 1832.

On the Circular and Flap Operations, by R. Tolefree, Jr., M. D. New York.

Am. Journ. Med. Sciences, vol. xiii. p. 370, 1833.

On Amputation of the Leg (especially by the method of Nathan Smith, M. D., Yale College, by Flaps), by Nathan R. Smith, M. D. Baltimore.

North Am. Archives, vol. i. p. 377, 1835.

Dislocation and Fracture of the Astragalus, unsuccessful efforts at Reduction, Extirpation, Amputation (death), by G. W. Norris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xx. p. 378, 1837.

Amputation of the Foot, by G. R. B. Horner, M. D., U. S. N.

Am. Journ. Med. Sciences, vol. xxi. p. 255, 1837.

Statistical Account of the Cases of Amputations performed at the

Pennsylvania Hospital from January, 1831, to January, 1838, by George W. Norris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxii. p. 356, 1838.

Amputation at the Hip-Joint (died in forty-eight days), by Daniel Brainard, M. D. Illinois.

Am. Journ. Med. Sciences, vol. xxii. p. 372, 1838.

Statistics of the Amputations of Large Limbs performed in the Massachusetts General Hospital, with Remarks by George Hayward, M. D. Boston.

Am. Journ. Med. Sciences, vol. i. N. S. p. 64, 1840.

Statistical Account of the Amputations performed in the Pennsylvania Hospital from January, 1838, to January, 1840, by G. W. Norris, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. i. N. S. p. 80, 1840.

Amputation at the Shoulder-Joint (died), with a Description of a new Instrument for securing deeply-seated Arteries, by Wm. E. Horner, M. D. Philadelphia.

Med. Examiner, vol. viii. p. 540, 1840; also *Am. Journ. Med. Sciences*, vol. i. N. S. p. 266, 1841.

Case of Gunshot Wound of the Hand, Forearm, and Arm, with a Fracture of the Humerus, successfully treated (without Amputation), by R. W. Lindsay, M. D. District of Columbia.

Am. Journ. Med. Sciences, vol. i. N. S. p. 117, 1841.

Fungus Hæmatodes of the Knee, Amputation (cured), by Henry L. Levert, M. D. Mobile.

Am. Journ. Med. Sciences, vol. vi. N. S. p. 56, 1843.

Amputation at the Shoulder-Joint, by N. Pinkney, M. D., U. S. N.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 332, 1846.

Amputation of the Foot—Excessive Hemorrhage from the Stump (over forty Ligatures applied), by J. C. Butler, M. D. Virginia.

Am. Journ. Med. Sciences, vol. xii. N. S. p. 541, 1846.

Amputation above the Shoulder-Joint, by David Gilbert, M. D. Pennsylvania.

Am. Journ. Med. Sciences, vol. xiv. N. S. p. 360, 1847.

Statistics of Amputations in the New York Hospital, from January 1, 1839, to January 1, 1848 (ninety-one cases, twenty-six deaths), by Henry W. Buel, M. D. New York.

Am. Journ. Med. Sciences, vol. xvi. N. S. p. 33, 1848.

Successful Amputation of the Shoulder-Joint, patient under Chloroform, by Paul F. Eve, M. D. Georgia.

Am. Journ. Med. Sciences, vol. xvii. N. S. p. 257, 1849; also *Buffalo Medical Journal*, vol. v. p. 533, 1849.

Amputation of the Leg for Gangrene of the Foot, successfully performed on a Negro at the age of 102 (died of Pleurisy), by Richard Jarrott, M. D.

Charleston Med. Journ., vol. iv. p. 301, 1849.

Case of Secondary Hemorrhage after Amputation at the Shoulder-Joint (cured by Pressure), by Charles S. Tripler, M. D., U. S. A.

New York Journ. Med., vol. iii. p. 40, 1849.

Amputations and Compound Fractures, with Statistics, by John O. Stone, M. D. New York.

New York Journ. Med., vol. iii. N. S. p. 298, 1849.

Successful Amputation at the Shoulder-Joint, by Paul F. Eve, M. D. Georgia.

Am. Journ. Med. Sciences, vol. xviii. N. S. p. 549, 1849.

Successful Amputation at the Shoulder-Joint in consequence of an injury sustained fifteen years previously, by Wm. Byrd Page, M. D. Philadelphia.

Med. Examiner, vol. v. N. S. p. 451, 1849.

Amputation of the Thigh, successful.

“ Leg, “

“ Thigh, cured in two weeks, by Paul F. Eve, M. D., Georgia.

Southern Med. and Surg. Journ., vol. vi. pp. 261, 264, 1850.

Amputation of the Leg during etherization (cured), by Henry H. Smith, M. D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 29, 1851.

Amputation of the Thigh (for Disease of the Knee-Joint; cured), by Henry H. Smith, M. D. Philadelphia.

Med. Examiner, vol. vii. N. S. p. 99, 1851.

Amputation of the Arm in a Case of Molluscum (successful, but disease returned in a few weeks), by Henry H. Smith, M. D. Philadelphia.

Am. Journ. Med. Sciences, vol. xxii. N. S. p. 397, 1851.

Amputation at the Hip-Joint (cured), by John Fred. May, M. D. Washington, D. C.

Am. Journ. Med. Sciences, vol. xxii. N. S. p. 313, 1851.

Amputation of the Thigh near the Trochanter (cured), by Jno. Fred. May, M. D. Washington.

Am. Journ. Med. Sciences, vol. xxii. N. S. p. 321, 1851.

Amputation of the Thigh for Tetanus, &c. (died), by Jno. Fred. May, M. D. Washington.

Am. Journ. Med. Sciences, vol. xxii. N. S. p. 323, 1851.

Amputation of both Legs (interval of seven days; cured), by Jno. Fred. May, M. D. Washington.

Am. Journ. Med. Sciences, vol. xxii. N. S. p. 325, 1851.

Amputation at the Shoulder-Joint (for Traumatic Mortification; died), by Jno. Fred. May, M. D. Washington.

Am. Journ. Med. Sciences, vol. xxii. N. S. p. 327, 1851.

Amputation at the Shoulder-Joint (cured), by J. Mason Warren, M. D. Boston.

Am. Journ. Med. Sciences, vol. xxi. N. S. p. 338, 1851.

Amputation of the Thigh, and subsequent Amputation at the Hip-Joint, by Wm. H. Van Buren, M. D. New York.

New York Journ. Med., vol. vii. N. S. p. 50, 1851, from *Trans. New York Acad. Med.*

Case of Amputation at the Shoulder-Joint (cured), by E. K. Sanborn, M. D. Lowell, Massachusetts.

Boston Med. and Surg. Journ., vol. xlvii. p. 89, 1852.

Statistics of Amputation at the Hip-Joint, by Stephen Smith, M. D. New York.

New York Journ. Med., vol. ix. N. S. p. 184, 1852.

Amputation at the Knee-Joint (cured), by Willard Parker, M. D. New York. (This paper contains statistics of this amputation.)

New York Journ. Med., vol. ix. N. S. p. 307, 1852.

Amputation at the Shoulder-Joint—Cure, by Richard L. Howard, M. D. Columbus, Ohio.

Ohio Med. and Surg. Journ., vol. iv. p. 288, 1852.

Amputation at the Hip-Joint (Boy, aged ten; cured), by J. C. Bradbury. Old Town, Maine.

Boston Med. and Surg. Journ., vol. xlvi. p. 349, 1852.

Amputation at the Hip-Joint (Adult; Fungus Hæmatodes; Lisfranc's method; three-fourths of the Flap healed by first intention, but death followed on the forty-first day after the operation), by E. M. Clark, M. D. Detroit.

Peninsular Journ. of Med., vol. i. p. 59, 1853.

Amputation at the Shoulder-Joint (cured), by E. R. Peaslee, M. D. New York.

New York Journ. Med., vol. x. N. S. p. 297, 1853.

Amputation of the Leg during the Progress of Gangrene of the Foot and Leg (cured), by Wm. Brodie, M. D. Detroit.

New York Journ. Med., vol. x. N. S. p. 325, 1853.

On the comparative merits of the Partial Amputations of the

Foot (Chopart's and Hey's, and in favor of Hey's), by J. M. Carnochan, M. D. New York.

New York Medical Gazette, vol. iv. N. S. p. 193, 1853.

Remarks on Osteo-Aneurism, with a Case involving the Condyles of the Left Femur (amputated; cured), by J. M. Carnochan, M. D. New York.

New York Med. Gazette, vol. iv. N. S. p. 2, 1853.

A Case of Osteo Aneurism (?) occurring in the Os Calcis—Amputation and Recovery, by Willard Parker, M. D. New York.

New York Journ. Med., vol. x. N. S. p. 316, 1853.

Remarks on Double Capital Amputation, with two Cases, by J. M. Carnochan, M. D. New York.

New York Med. Gazette, vol. iv. N. S. p. 145, 1853.

Amputation at the Shoulder-Joint (cured), by Chas. Freiwalt, M. D. Troy.

New York Journ. Med., vol. xi. p. 331, 1853.

Amputation at the Large Joints—Statistics of Amputation at the Shoulder and Elbow-Joints, by Stephen Smith, M. D. New York.

New York Journ. Med., vol. x. N. S. p. 9, 1853.

ALPHABETICAL LIST

OF

AMERICAN SURGEONS,

FROM THE YEAR 1783 TO 1853, INCLUSIVE.

WITH THE

TITLES OF THEIR BOOKS AND PAPERS AS QUOTED IN THE PRECEDING
BIBLIOGRAPHICAL INDEX.

The dissimilarity that may be noted in the number and variety of the papers assigned to the Surgeons quoted in the preceding Index, must not be regarded as resulting solely from the difference in the number of their publications, but rather from the fact that their articles were so issued as to be accessible to the Author. Some of them have doubtless escaped his notice, either in consequence of the limited circulation of the journals in which they were published, or from the difficulty attendant on their preservation in our libraries; but as he has carefully examined most of those published in the last seventy years, the greater portion of their writings will, it is thought, be found to be referred to in the foregoing list.

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OPERATIVE SURGERY.

PART I.

GENERAL DUTIES AND ELEMENTARY OPERATIONS.

INTRODUCTION.

OPERATIVE SURGERY, in the usual acceptance of the term, has been so long regarded as designating that department of medicine in which diseases are treated by means of cutting instruments, that the importance to an operator of other qualifications than those of manual dexterity is liable to be overlooked. Although every medical man is presumed to know that a successful surgeon must necessarily be also a good physician, yet as the absence of reference to this fact may lead the inexperienced to place too much confidence in mere mechanical measures, it seems right, in this portion of the work, to call the attention of the reader to the value of constitutional treatment, in connection with surgical operations of a hazardous kind.

The human system, upon which a surgeon acts mechanically, is a combination of organs, so mutually dependent on each other, that the removal of any portion, or even the partial division of that tegumentary membrane which encases and protects the whole, frequently creates derangement which nothing but judicious medical treatment can remedy. Appropriate constitutional measures are therefore often as essential to the success of an operation, as anatomical knowledge and manual dexterity is necessary to its performance; and the happiest results will usually be obtained by those who closely attend not only to the local, but also to the general management of the cases on which they operate. For this reason, it will generally be found that a successful surgeon is not only a judicious

practitioner of medicine, but also a devoted nurse and careful observer of the varying conditions of the system, under all circumstances. In every operation, he justly feels that he is largely indebted to nature for the result; without her aid he neither anticipates nor obtains success, whilst with it, especially as exhibited in the process of adhesion, or reproduction of tissue, he possesses a power that seems almost divine.

Admitting the necessity of thus combining medical skill with operative dexterity, there yet remain to be noticed, two special duties which are essential to a correct appreciation of the extended qualifications requisite in an operator, to wit, tact in diagnosis and a correct knowledge of surgical pathology.

By diagnosis, the various mental and physical processes which ennoble and augment the value of operative proceedings, are brought into play. In the practice of medicine, the power of diagnosing disease is universally esteemed a test of skill, but in surgery it is occasionally apparent that its acquisition is deemed more easy and of less value, than that assigned it in the kindred branch of the profession. In surgery, a correct diagnosis is also often deemed a matter of little difficulty, because, as the duties of the surgeon are limited to external complaints, many presume that their characteristics are more tangible, and present peculiarities which can be more readily recognized by the senses. Slight practice will, however, convince any one who entertains this opinion, that the mere acquisition of that nice sense of touch, which is essential to the diagnosis of certain surgical diseases, is of itself sufficiently difficult, to say nothing of the experience necessary to regulate the mental impressions which touch creates, and without which, every surgeon would be liable to err, and induced to operate in cases which a more practised touch would have taught him to avoid. In operative surgery, diagnostic errors also take effect so quickly, that heavy and prompt responsibility is connected with its exercise by an operator, his means of treatment being liable to destroy life, or produce irreparable mutilation before he can recognize his mistake, whilst the action of medical means of treatment, even when attended by as much danger, yet leaves more time to obviate it. A correct diagnosis is, therefore, always presumed to precede every attempt at the use of instruments.

Skill in surgical pathology, or a knowledge of the peculiarities of diseased structure, together with the general phenomena of abnor-

mal action, is also a qualification which cannot be too highly estimated in weighing the amount of knowledge essential to the formation of a good surgeon. On the perfection of the knowledge possessed by an operator in this department, rests the necessity of submission by the patient, to any operative proceeding. If it is requisite to remove a tumor, the surgeon is always supposed to have fully recognized its characters and probable progress before recommending its extirpation; while his decision in regard to the propriety of amputation (as shown in the serious question of loss of limb or life), can alone be correctly based on such a perception of those general actions of the economy, as surgical pathology alone teaches. While, then, for the advantages of methodical arrangement, the ensuing pages are mainly limited to mechanical details, let it be especially remembered, that there is no intention of giving them any other value than that of being *one* of the means of surgical treatment occasionally demanded for the relief of disease, and that the apparent prominence thus given to the more mechanical portion of surgery, is permitted, only with the view of tempting the student to repeat the operations upon the dead body until he has acquired the manual skill necessary to fit him for operating on the living; after which, the additional knowledge of the physician must be brought to aid in the result, or the surgeon will degenerate into a "cutter."

With this explanation, the subject of operative surgery may be divided into two parts: 1st. Minor Operative Surgery, or simply Minor Surgery, in which there is usually but little danger to the life of the patient, from the means employed; and 2d, Major Surgery, or Operative Surgery proper, where, from the more free use of instruments, risk to life may reasonably be anticipated. To show the various modes of operating, and especially such as are resorted to by surgeons in the United States, is the object of the present volume.

For the exposition of the duties of Minor Surgery, the reader is referred to the various treatises upon the subject, among which may be found the third edition of that published by the author of these pages.¹

In the systematic arrangement of the work, five divisions may be

¹ Minor Surgery, or Hints on the Every-day Duties of the Surgeon, 3d edition, Philadelphia, 1850.

advantageously made: 1st. General Duties and Elementary Operations. 2d. Operations on the Head and Face. 3d. Operations on the Neck and Trunk. 4th. Operations upon the Genito-Urinary Organs; and, 5th. Operations on the Extremities.

In adopting this order, I have been guided by the opinion that the natural relation of parts is that in which any one desiring information in respect to an operation, would almost intuitively seek it. Thus, the treatment of Harelip would naturally be looked for in connection with operations on the lips, and not among those performed for malformations of the soft parts, or disorders of the skin or muscles; while the process of Trephining would be sought under injuries of the cranium, and not under that of affections of the bones. With the same views, the details of each operation will be presented in the order in which the operator should attend to them. Thus, before operating, the surgeon naturally thinks of the anatomical relations of the region upon which he is to act; then of the methods of operating; then of the instruments that may be required; then of the dressings; and, lastly, of the adjuvants necessary either to the local or general means of treatment.

CHAPTER I.

OF THE GENERAL DUTIES OF AN OPERATOR.

By the general duties of an operator, are understood all such acts as may be required in connection with his mechanical proceedings. These duties may be classed under three heads: 1st. Attention to the patient; 2d. Preparation of instruments; and 3d. Selection of assistants.

SECTION I.

ATTENTIONS TO THE PATIENT.

The attentions required by the patient, may be subdivided into three periods: those which are demanded before the operation; during its proceedings; and subsequent to its performance.

As every operation in surgery is undertaken solely with the view of benefiting the patient, the duties of an operator necessarily commence with the establishment of a correct diagnosis. Certainty, or a cautious examination of the nature of the disorder, should in all instances be a *sine quâ non* to any operation. Without it, every application of the knife becomes barbarous and unjustifiable, and he who entertains a just view of the responsibilities of a surgeon, will ponder long and seriously upon the propriety of operating in any case, where he is likely to expose his patient to greater risks than those arising from the treatment of the affection by other remedial measures.

The Prognosis of an operation, or the opinion that the result to the patient will be preferable to his condition before it, should in like manner be firmly settled; but as all men are liable to error, even when caution is largely exercised, it becomes the surgeon's duty to demand a consultation with one or more of his professional brethren, in every case where it is possible, not only in order to render the necessity of the operation certain, but also to secure his own reputation as to its correctness. The many cases of error of judgment that have been published through the honorable candor of surgeons possessed of the highest skill, renders such a course essential not only to the comfort of every young operator, but also absolutely necessary to his personal safety and immunity from the vexatious legal actions, so often exhibited, at the present time, in many portions of the United States. The propriety of amputations has more than once been subsequently doubted; lithotomy has been performed when a calculus did not exist; whilst the cure of fistula in ano, or the performance of plastic operations, has sometimes left the patient in a worse condition than he was previously. The result, also, is by no means the same, even under apparently similar circumstances. Death has occasionally ensued from an apparently simple operation; a greater deformity has been created by operating for strabismus than that which previously existed, and new noses have not always proved as handsome as the old. The issue should, therefore, be carefully weighed by each surgeon, before operating, if only on account of his own reputation. But when, after due deliberation, the affair has been decided, let him immediately, and with perfect confidence, assume his part as the operator, and give his attention to such general and local measures as will facilitate the accomplishment of his object.

§ 1.—*Duties of a Surgeon before Operating.*

Among the first of the general measures required before operating, may be placed the employment of such means as are occasionally necessary to induce the patient to consent to the performance of the operation. Sometimes it happens that the individual is so timid and fearful of pain, as to require strong inducements to lead him to suffer that which is requisite for his cure. Under such circumstances, the surgeon may be obliged to promise largely, or present a lively delineation of the benefits that will result from its performance; but if, on the other hand, his patient is over-bold, or has obtained too exalted an idea of the advantages that will accrue from the operation, it may become necessary to diminish his anxiety to submit, by pointing out the risks to which he will be exposed; lest, anticipating too much, and being disappointed, he throw the blame upon his surgical attendant.

Especially is this caution requisite in the case of females who demand an operation for the improvement of their appearance.

A young girl is annoyed by a squint, and hopes to augment her beauty; or she has been disfigured by a burn, or deformed from a fracture, and, full of the successful histories of friends and neighbors, almost insists upon an operation. In these cases, it is imperatively the surgeon's duty to display the darker tints of the picture, and limit the anticipations that hope and vanity have so readily created.

In this, which has been termed the "moral preparation" of a patient, many of the measures necessary to be employed must be decided by that indefinite quality of the mind known as "tact;" or that nice perception which enables any one to anticipate the most agreeable method of accomplishing an object. Some surgeons possess it naturally in a high degree, whilst others are less brilliant. A proper study of character, together with a close observation of the mental imbecility of those who exhibit such peculiarities, will, however, do much towards enabling any surgeon to obtain such an amount of it as will enable him to control if he cannot change his patient's peculiarities. Nor is this study of a patient's mental idiosyncrasies only of importance in respect to his comfort; it is also often found to be closely allied to the result of the case. Fear depresses the vital powers, but hope enlivens and elevates them; and their undue excitement in any case may, therefore, either

prove a serious obstacle, or a powerful lever to the attainment of the surgeon's object.¹

From the extensive sympathies of one organ with another, it also becomes the operator's duty, at this stage of his proceedings, to look not only at the mental, but also to the general condition of his patient. Let him see that the digestive organs are as far as possible free from disease, and active in the performance of their functions; that the secretions of the liver and kidneys are not obstructed; that the lungs and heart are in a proper condition for the circulation of the blood, and that the head is free both from mental and physical disorders; in other words, let him always satisfy himself before operating, that his patient is possessed of the *mens sana in corpore sano*; or, in other words, that he is, as far as may be, sound both in body and mind.

After thus attending to the general preparation of the patient, the surgeon should next turn his attention to such means as will facilitate his own movements, and save his patient unnecessary suffering. In some few instances, the development of the patient's sensibility, as indicating the probable amount of the subsequent inflammatory action, is an object at the time of the operation, as is seen in the use of stimulants for the cure of hydrocele, where the complaints of the patient are often taken as the index of the probable action of the article that has been injected into the sac. But, in the majority of cases, the creation of pain during an operation can only be regarded as both unnecessary and injurious. The surgeon should, therefore, prevent it, and save his patient the excitement formerly caused by the use of the knife, by resorting to Anæsthetics, especially before severe operations. As the safety of such a course has been most widely tested at the present day, philanthropy, and that desire to ameliorate the sufferings of mankind which is the true basis of sound practice, demand that neither prejudice nor ignorance of their effects, should longer prevent their employment by every operator.

Eight years have now elapsed since the use of Ether as an Anæsthetic was suggested by Dr. Morton, of Boston, and applied in surgery by Dr. John C. Warren, of the same city. The best surgeons throughout the globe have employed it, and even those not so well

¹ For many excellent details on the moral preparation of the patient, see *Pathologie Externe*, par Vidal du Cassis, tom. i.; also *Velpeau's Surgery*, by Drs. Mott & Townsend, vol. i., New York, 1847.

informed have not hesitated to resort to its influence. Yet, out of the thousands thus indiscriminately exposed, few have suffered from its effects, whilst numbers have passed through the most severe operations without being conscious of anything more than "a pleasant dream."

In my hands, pure Ether was at first very widely administered; but I have, for some time past, more frequently resorted to it mixed with Chloroform, in the proportion of one part of the latter to five of the Ether, by weight, and have yet to see the first patient in whom evil has been caused by its use. Pure Chloroform, though highly esteemed by some surgeons, and especially by those of Europe, is certainly a more dangerous substance, as is frequently shown by the reports of the deaths that have ensued upon its administration. Having also been once an eye-witness to the risks attendant on its use, and aware of many others in the hands of skilful surgeons, I feel compelled to offer this caution against its administration.

Ether, or ether and chloroform, mixed in the proportion just stated, is, in my judgment, an anæsthetic that may be safely administered by any well-educated physician. That it is a powerful sedative, and liable to abuse, cannot be doubted, yet is it by no means so dangerous as aconite, morphia, or many other articles of the *materia medica* in daily use. That any anæsthetic requires to be judiciously or even cautiously administered, is also true; but there is no portion of our professional duties which does not require the same caution; and the liability of anæsthetics to be abused, therefore, loses its weight as an argument against their proper use.

In the administration of Anæsthetics, almost any article will answer for the application of the vapor to the mouth of the patient, such as a hollow sponge, towel, or handkerchief. But, as these agents are exceedingly volatile, much will be wasted when they are thus employed; in addition to which, the operator will suffer, as I have often done, from the lassitude consequent on breathing the atmosphere around the patient whilst administering ether in this manner during a prolonged etherization. I prefer, therefore, in all cases, the use of a simple cone, open at both ends, to surround the sponge, as it prevents the waste of the ether, and yet furnishes quite enough fresh air to obviate any inconvenience to the patient.

The importance of recognizing the precise period when anæsthesia is induced, and thus guarding against the administration of an unnecessary amount of the anæsthetic agent, has induced surgeons to

pay special attention to the signs which most correctly indicate "when the patient has had enough," at least for the moment, and I shall briefly state them in connection with the mode of administration pursued by myself in several hundred cases, without ever having seen any ground for the apprehension of danger.

Administration of Anæsthetics.—The purest ether and chloroform being ready mixed, in the proportions of one part of chloroform to five of ether, by weight, and well shaken together in a bottle, a good soft, porous, cup-shaped sponge, which has been previously soaked in warm water and then wrung dry in a towel, should be moistened by pouring over its surface about half an ounce of the mixture. The patient being then placed in the proper position for the operation, should have the neck entirely freed from the constriction of any portion of the dress, the precaution having been also taken to keep the stomach nearly empty, for three hours before the operation. The attendant who is to administer the anæsthetic—and he should also do nothing else—having then placed himself near the patient's head, should hold the sponge or cone lightly between his thumb and forefinger, so that his hand may not obstruct the passage of fresh air through the cells of the sponge, and apply it within two inches of the patient's mouth and nostrils. Then, whilst feeling the pulse with the other hand, let him direct the patient to take a long inspiration, and also to expire through the sponge. As the patient's lungs become accustomed to the stimulus of the vapor, the assistant should at once apply the sponge closer to the mouth and nostrils, turning it round occasionally, and taking care not to compress it, lest the ether escape from the sponge upon the patient's skin and irritate it. When the cone is employed, this inconvenience is also obviated. After a few inspirations, or in about two or three minutes from the commencement of the inhalation, the pulse will be found to quicken till it may count 100 or 120, and then, as the respiration becomes slower, gradually diminish in frequency. At this period—that is, when the pulse commences to change its frequency—close attention should be paid to the perfection of the inspiration, and a close examination made of the state of the patient's muscles. If these continue to act, anæsthesia is not yet perfectly induced; but if, whilst the patient is quiet, his arm, on being raised, drops, as if lifeless, or if the eyelid, when opened, remains so, or simply drops, and the eyeball continues turned upwards, the pulse remaining of good volume, anæsthesia is perfect, and the operation may safely proceed, the sponge being reapplied as often as signs of consciousness return.

The effects of anæsthetic inhalation have been well described by Dr. Warren, as follows:—

“On inhaling Ether, the patient’s respiration is at first short and quick, and apt to be followed by a cough or gasp, which induces the patient to refuse the inhalation.¹ The bronchia becoming accustomed to the vapor, the respiration becomes fuller and slower, till at last the inspiration is taken to the fullest extent, when, as etherization is induced, it becomes slower and comparatively feeble.

“The pulse at first is quickened, but soon begins to diminish in frequency, and ultimately becomes slow, till it counts even as low as forty or fifty in the minute.

“As soon as the pulse begins to diminish in frequency, the inhalation may be checked, and the soporific effect of the vapor carefully noted. The face and neck will soon be seen to become flushed and heated, and the action of the heart to be strong and vibrating. The conjunctiva is also apt to become temporarily injected, the eye vacant and listless, and the patient soon loses all control over vision.

“The muscles are often excited at first, and their increased action sometimes makes the patient troublesome until perfect etherization is induced.”² But, with the mixture of one part of chloroform and five of ether, just referred to, this muscular excitement is less frequent. In either case, however, a serious operation should not be commenced until this stage has passed, and a slight continuation of the inhalation will soon remove it.

“Dr. Simpson, of Scotland, has observed that, to produce the full and perfect effects of etherization, the following conditions are necessary. First, the patient ought to be left in a state of absolute quiet and freedom from mental excitement, both during the induction of etherization and during his recovery from it. All talking and questioning should be strictly prohibited. Secondly, the primary stage of exhilaration should be entirely avoided, or at least reduced to the slightest possible limit, by impregnating the respired air as fully with the ether vapor as the patient can bear, and by allowing it to pass into the lungs both by the mouth and nostrils, so as to superinduce rapidly its anæsthetic effect.”³

The quantity of ether necessary to induce anæsthesia will depend

¹ When the ether is combined with chloroform in the proportions above mentioned, this temporary irritation is less frequently noticed.

² Etherization, by John C. Warren, M. D., Boston.

³ Simpson on Anæsthesia, p. 27.

in a great degree upon the peculiarities of individuals. Females, and especially those of a nervous temperament, require a much smaller quantity than males; and, among the latter, those accustomed to the free use of ardent spirits will require more than those who are temperate. In fact, it has often seemed to me that the amount of ether requisite to induce anæsthesia, might be taken as a good index of the habits of the patient, some having "stronger heads" than others. I usually give about half an ounce at first, and then, if this is inhaled without inducing anæsthesia, pour on a half ounce more, repeating this amount from time to time, as the sponge becomes dry. A single half ounce is sufficient for females, though I have administered over four ounces in different doses to males of intemperate habits. Dr. Hayward, of Boston, who was among the earliest of those who administered ether, by itself, states¹ that, in operations which require from five to ten minutes for their performance, he has found from three to six ounces sufficient, if the ether is of the purest kind (rectified); but that a much greater quantity may be used with perfect safety, and the patient kept under its influence a longer time without danger, by removing the sponge occasionally, and reapplying it when sensibility is about to return. The same surgeon also states, as evidence of the safety with which Ether may be thus administered, that he has given it to "infants of seven weeks old, and to individuals of seventy-five years, with entire success. He has also administered it to persons suffering under chronic pulmonary disease, not only without injury, but, in some cases, with decided benefit. In fact, he hardly knows a state of the system in which he would be deterred from using it, if called on to operate." Though a warm advocate of the safety of ether, Dr. Hayward objects to the use of chloroform and of chloric ether, on account of the poisonous effects which he thinks are peculiar to chloroform.

As the opinions of surgeons have differed widely in relation to the safety and advantages of ether over chloroform as an anæsthetic, I cite the following expressions of their sentiments:—

Dr. H. J. Bigelow² always uses ether, and never pure chloroform, when it can be avoided, believing that "ether merits an unquestionable preference over chloroform."

¹ Remarks on the Comparative Value of different Anæsthetics, Boston Med. and Surg. Journ., 1850.

² Morton, Physiological Effects of Sulphuric Ether.

Dr. J. C. Warren¹ thinks ether decidedly preferable to chloroform as an anæsthetic.

Dr. Jno. Ware, of Boston; Jno. Watson, Gurdon Buck, Jr., and A. C. Post, of New York; J. Knight, of New Haven; Wm. M. Wood, of the Navy; Mütter, and many others in Philadelphia, also regard ether as a less dangerous article than chloroform. Some of the latter surgeons have, however, in common with myself, employed the combination of ether and chloroform, in proportions which have varied from one and three to one part of chloroform to five of ether by weight; and believe that, as thus combined, the muscular excitement which is often marked on the administration of ether alone is counteracted by the sedative influence of the chloroform, whilst the dangerous sedation caused by the latter in its pure condition is obviated by the stimulus of the ether.

Drs. R. D. Mussey and Wm. H. Mussey, of Cincinnati, having, in 1849, nearly lost a patient under the unskilful administration of chloroform, have continued to employ the mixture of chloroform and ether. "They now use no other anæsthetic agent, under the opinion that the ether sustains the vital powers against the purely sedative effect of the chloroform."² Dr. Mussey has, however, experienced accidents from even this.

Dr. Geo. Hayward, of Boston, has used both, but is doubtful of the safety of chloroform alone.

Drs. Parker and Mott, of New York; Bolton, Gibson, Cunningham, and Parker,³ of Richmond; Nathan R. Smith,⁴ of Baltimore; Eve, of Georgia, with others, formerly preferred chloroform, though I do not know their present views in relation to it. Soon after the introduction of chloroform, the opinion of surgeons seemed to be much divided in regard to the safety of the two articles; but subsequent experience, judging from reports of accidents following the use of chloroform by itself, inclines me to think that, at present, those who prefer chloroform to ether as an anæsthetic agent are in the minority. In Boston, several surgeons have, in recent cases, employed the pure chloric ether in preference to the sulphuric.

Dr. Jno. Fred. May advocates chloric ether, preferring it to all other agents. During three years he has used it liberally in hospital and private practice, and given it to all ages, from the infant to the

¹ Address to Am. Med. Association.

³ Transact. Am. Med. Association, vol. i.

² Western Lancet, 1853.

⁴ *Ibid.*

old and infirm man, from a few minutes to more than an hour at a time, without being disappointed in its effects in a single instance.¹

As it is of great consequence that both ether and chloroform, when employed, should be as pure as possible, the surgeon will do well to try the following processes before resorting to any parcel that may be obtained from a druggist:—

To test the purity of Chloroform, Dr. Fleming, of Dublin, recommends that chloroform should first be tested by holding a piece of litmus paper over the mouth of the bottle. If the vapor reddens or bleaches it, the article is unfit for inhalation. He next drops a little chloroform into a glass containing water or a solution of nitrate of silver. If the chloroform remains like a transparent globule at the bottom of the glass, it is good; but if the globule appears like a muddy lens, or becomes opalescent, it is adulterated, and unfit for inhalation.²

In order to enable a surgeon to resort to the common ether when he is unable to obtain the purer article, the following process for washing and testing it is given:—

To wash Ether.—Pour the ether (say six ounces) into a large bottle, and add about half a pint of water; then agitate them by shaking the bottle, and pour all the contents into a filtering glass, or decant the ether carefully. The ether, being slightly soluble in water and lighter, will float, and may be readily poured off, whilst any alcohol it may contain will unite rapidly with the water, and sink with it when the agitation ceases. If any sulphuric acid is present, litmus paper, dipped in the ether, will be reddened; but if it is free from acid, the paper will remain unchanged. If the ether, when poured on a cloth and allowed to evaporate, leaves much odor, it is impure.³

The following rules in relation to the use and administration of anæsthetics, suggested in a valuable report “On the Utility and Safety of Anæsthetic Agents,” embrace so much that my own experience has confirmed, that I shall enumerate them, in a condensed form from the report of a committee consisting of Drs. Bolton, C. B. Gibson, Cunningham, and Parker, of Richmond, to the Medical Society of Virginia, with a few additions:—

1st. Test the purity of the article to be employed.

¹ Am. Journ. Med. Sciences, vol. xxii. N. S. p. 329, 1851.

² Etherization in Surgery, by Dr. Fleming. Dublin, 1851, p. 52.

³ Jackson on Anæsthetic Agents. (See Bibliography.)

2d. Examine the general condition of the patient. Organic disease of the heart or lungs, and a tendency to apoplexy, generally contra-indicate the use of anæsthetics.

3d. Place the patient in such a position (recumbent or reclining, if possible) that the vapor may gravitate towards the mouth. The relaxation of the muscles consequent on anæsthesia also forbids the upright position.

4th. Avoid administering anæsthetics on a full stomach, as it delays anæsthesia, and nearly always causes subsequently, profuse vomiting.

5th. See to the introduction of a full supply of fresh air with the vapor of the anæsthetic.

6th. Secure complete anæsthesia before commencing a serious operation, and maintain it during its performance.

7th. Pay more attention to the effect than to the quantity administered, except in using chloroform, when more than half a drachm at a time is often hazardous, as the effects are cumulative and very sudden.

8th. Let it be the special business of an assistant, who has experience in the administration of anæsthetics, to attend to the etherization.

9th. Always have a bottle of strong aqua ammonia at hand, as well as a basin of cold water, in case of accidents.

Means to be employed to resuscitate a patient when over-dosed by an Anæsthetic.—Although I have never seen any cause for apprehension in the use either of pure ether or ether and chloroform when combined in the proportion of five of ether to one of chloroform, yet as the accident may happen, and as it has often happened where chloroform alone has been employed, a brief reference to the best means of resuscitating a patient may save life, by aiding the inexperienced in their efforts.

1st. Thrust the fore-finger into the top of the larynx, and remove the epiglottis from it, if spasmodically closed.

2d. Practise artificial respiration by pressing alternately on the chest and belly, so as to excite the diaphragm, and then breathe into the patient's mouth, whilst his larynx is gently pressed back to the front of the vertebræ, so as to close the œsophagus and prevent the air passing into the stomach.

3d. Apply strong aqua ammonia, on a sponge, to the nostrils, as soon as the patient gasps, or before this, if the effort is not soon made.

4*th*. Dash cold water suddenly on the face, top of the chest, and head.

5*th*. Have ready, especially in hospitals where anæsthesia is frequently resorted to, an electro-magnetic apparatus, by which muscular action may be sustained in the heart and chest.

These rules embody the most useful means of resuscitation, and are thus briefly stated in order to facilitate their remembrance when needed.

Effects which sometimes ensue on the use of Anæsthetics.—Some patients, on recovering from the state of anæsthesia, resemble the maudlin condition of a man half drunk, and are either very merry or very sad, jocose or sorrowful. Females also often present symptoms of hysteria, and this condition may last twenty minutes, or more, though it is not always seen. Rapid and even rough sponging of the face and head, together with the admission of an abundance of fresh air into the patient's lungs, will generally promptly remove it; if not, a little time will. If, however, the patient has been kept perfectly quiet, and the etherization has been judiciously conducted, that is, not pushed too rapidly, and to the exclusion of the proper amount of fresh air, this state will be less frequently noted. If the stomach has been kept empty prior to etherization, nausea or vomiting will also be rare; otherwise, it will frequently supervene. When it does, it may be most promptly relieved by giving free draughts of warm water, to evacuate the contents of the stomach; after which, the organ will generally remain quiet. In most instances, however, anæsthesia is not attended by inconvenience, and these effects will be found to be due either to individual idiosyncrasy, or, more frequently, to the surgeon's inattention to the administration of the anæsthetic, especially in connection with the use of food. The stomach must be kept empty, if headache or other inconvenience is to be avoided.

The local arrangements requisite for the performance of the operation should next claim attention—such as the preparation of the parts to be operated on, and the employment of the measures likely to facilitate its performance. These measures may be summed up in two rules: 1*st*. To remove everything that can impede the operative proceedings. 2*d*. To employ such means as will especially facilitate them.

In observing the first rule, the operator must necessarily be directed by the peculiar circumstances of the operation: thus, a contracted pupil will interfere with the operation for cataract; a distended rectum increase the dangers of lithotomy; whilst the

presence of hair about the part may render the dressing difficult, cause irritation from discharges, or possibly lead to crysipelas. Under the second head, or the direct efforts likely to facilitate the accomplishment of the operation, may be placed the removal of all unnecessary clothing, and especially of any that is tight at the neck, as close-fitting jackets or shirts; the cleansing of the part from plasters and poultices; and the employment of such means as will tend to secure the safety of adjoining organs, or render those operated on more prominent, as the injection of the bladder in lithotomy and lithotripsy, or the retention of urine in similar cases. Attention to such a position of the part as will tend to drain it of blood, will also occasionally be required—as in large pendulous tumors or diseases of the extremities, where the elevated position will often prevent much unnecessary depletion.

§ 2.—*Duties during the Operation.*

The duties of a surgeon during an operation embrace two distinct portions: first, those which are requisite for himself, and which, as he acts solely for the benefit of the patient, may be justly placed in the front rank; and, second, those demanded for the comfort and safety of the individual operated on.

Among the first of the surgeon's duties to himself, during an operation, is certainly a perfect degree of preparation for that which he is to execute.

In addition to such professional acquirements, as a knowledge of structure, or of mechanical skill as an operator, he should also, in capital operations, or those of great delicacy, give some attention to the state of his own system. Without a sound condition of his own body, no surgeon can be fully prepared to operate upon that of another. Let him, therefore, at least for some hours previous to an operation, abstain from every act, article of food or drink, that can in any way tend to derange his nervous system. Let him secure a proper amount of sleep on the previous night, and, if he desires to have the most perfect control of his fingers, let him also abstain from anything like violent muscular effort immediately before his appointment. The mere exertion of lifting the patient, or of driving a hard-mouthed horse, will in some persons be quite sufficient to impair the entire command of their muscles, though others of a coarser mould may possibly find such attention to personal details perfectly unnecessary.

It may also, perhaps, be thought useless to refer to the propriety of abstinence by medical men from nervous stimulants, on all occasions; but, as steadiness of hand is peculiarly important to a surgeon, attention to such a point is especially necessary previous to an important operation.

While operating, the surgeon should endeavor to have his eyes and ears, as well as his hands and brain, fully ready for every event; and so intent will a good operator be upon that which he has to perform, that it often happens he is perfectly unaware of the patient's cries, or of affairs passing around him, until he has accomplished his object. In the event of any unexpected change, either in the tissues through which he is cutting, or variation in the character of the complaint which he intended to treat, he should always endeavor to remain perfectly self-possessed. If a large vessel suddenly springs, let him remember that it is only necessary to compress it with his finger until it can be tied with a ligature. If a tumor has deeper attachments than was anticipated, he has only to free it from these parts, instead of those for which he commenced his operation; if it proves to be of a different character from what it was supposed to be, let him think that he can accomplish this new affair as readily as that which was at first proposed. If his hydrocele, on being tapped, prove to be a sarcocele, let him, if necessary, at once proceed to the extirpation of the testis; but under no circumstances let him for a moment suppose that anything has occurred which his skill and coolness cannot remedy. If the patient faints, he knows that it is a simple matter, and that lowering the head, and stimulants, will soon revive him. If convulsions supervene, as in trephining, is it not an additional reason for the more prompt application of the remedial measures? If, unfortunately, air enters into a large vein, will not the prompt pressure of the thumb arrest its progress to the heart, and subsequent manipulation expel it from the vessel, or prevent serious injury; as in the case reported by Dr. R. D. Mussey, of Cincinnati, in which the effects of the entrance of air into the subclavian vein was relieved by the application of stimulants to the nostrils?¹ In fact, let what will occur, the surgeon who undertakes an operation, is totally unfit for his duty if he cannot, by these or similar views of serious difficulties, preserve sufficient equanimity to meet them. Although he

¹ Am. Journ. Med. Sciences, vol. xxi. p. 392, Phila. 1837.

may not be able to acquire the entire philosophy of the Stoics, some cultivation of it is certainly desirable, and such stoicism is not rashness, nor yet total indifference, but only that state of mind which the French have justly termed "*sang froid*," a phrase which presents us with a most apt expression of the consummate coolness that always characterizes a good operator. How to gain it, cannot be told. In some men it is intuitive; but it may also be most certainly acquired by practice; and nothing within my experience is more conducive to it than the fact of an operator duly weighing beforehand, every accident that can possibly, not probably, happen. When prepared for danger, it loses more than half its paralyzing power. When a young surgeon—wanting in experience of the changing scenes or excitement often noticed during an operation—is so situated that he can avail himself of the lessons furnished by observation of the habits and course of action of his seniors, he should seize them promptly, for they possess a value which naught but subsequent practice will enable him justly to estimate.

Another portion of the surgeon's duties, during an operation, will be found in the various positions and manœuvres he will be required to execute, all of which should be duly settled before he commences. Thus, in an amputation, he should settle in his own mind which position will give him the most perfect control of the patient's limb, or on which side he can most conveniently dissect out a tumor; in what manner he will remove a stone, or ligate an artery; what shall be the position of the patient, and what the position of the assistant, so that each detail shall be fully weighed. But as such arrangements vary much under different circumstances, the further consideration of them can be best given under their proper head.

The credit which has been attached to certain operators, in reference to the rapidity of their operations, presents another point to which, at this period, attention may well be directed. "If it were done when 'tis done, then 'twere well it were done quickly," is the rule apparently of some who enter the surgical arena, it being evident that the most thought is given to that portion of the sentence in which reference is made to time. But though this may suit the spirits of those who, in true Shakspearian style, look upon an operation as a dramatic exhibition, it is certainly not adapted to those of others, who, with a more manly view of responsibility, regard the interests of the patient as paramount to everything else. Safely

at all events, quickly if you can, should be the motto of every considerate operator; and the slow and sure will very often prove to be the quickest in the end.

During the operation, the surgeon's duties to the patient are very much limited to those just enumerated in connection with himself. The assistants must necessarily do much towards attending to the patient's comfort and relieving his wants; they should give him drink, and revive or restrain his irritability according to circumstances; whilst the operator, by leaving such duties to them, may confine himself strictly to his own acts, or simply encourage his patient by voice and manner as he proceeds.

The duties of assistants will be detailed hereafter.

§ 3.—*Duties after the Operation.*

Notwithstanding the possession of all the qualifications and skill which have been detailed as essential to an operator, the best operations will be likely to fail, unless the surgeon is also equal to the performance of the duties which ensue upon its completion. The proper application of the dressings; the judicious employment of remedies to counteract the violence necessarily caused by the operation; the arrangement of the bed, the position of the patient, and of the part operated on; the resort to stimulants, the encouragement of sanguine anticipations; the calm of sleep, together with diet, &c., are but a few of the points to which his attention must now be given. To the well-educated surgeon, reference to such details may seem to be a work of supererogation. But to the less accomplished or experienced operator, or to practitioners whom circumstances compel to act the part of a surgeon, the recapitulation may not be without its value. As a general rule, most of these duties may be summed up under one direction, to wit: the observance of such a course of treatment as any good physician would naturally direct, even if not possessed of surgical experience. A few of them, however, which embrace matters essentially surgical, seem to demand a closer examination, especially the employment of stimulants, diet, and exercise.

In respect to stimulants and diet, as all rules must be dependent on the object to be attained by the operation, it becomes difficult or impossible to establish any one law which will be applicable to every

case; and yet a mistake in relation to this most important part of the after-treatment may cause the failure of all previous arrangements. It may, however, be said that, generally, an operator will not err in this part of his duty, if he bears in mind the great principles of all sound practice, viz. the treatment of Inflammation. Is the wound to heal by the first intention, or by granulation? Is the object of the operation to be attained by exciting inflammation, or will its development destroy the result? Is the action to proceed simply to effusion of lymph, or to suppuration? Is the exercise of the part operated on essential to its cure, as in strabismus, or is its perfect rest necessary to success, as in false joint? These and similar interrogatories will soon settle the doubts of any well-trained medical mind in these details.

As respects the proper diet of a patient after an operation, much will of course depend upon the replies made to the above questions; but in many operations, such as amputations, removal of tumors, and resections, where moderate vascular excitement is not likely to result in hemorrhage, a surgeon will be very liable to error if he invariably places his patient upon a restricted diet, either before or after the operation. In some instances, and especially in advanced life, the change from ordinary food to a strict diet is alone sufficient to disorder the digestive organs, affect the circulation, and derange the nervous system, even where no other cause is liable to act on the patient's general health. How likely, then, is it to do harm, when, in addition to change of diet, the shock of an operation is conjoined with the other perturbing causes. In most instances, and especially where common prudence does not clearly demand it, the operator should therefore make no other change in the previous diet of his patient than simply to restrict the quantity. Indeed, in some instances even this will do harm, especially if it is combined with purging. An increase both in the quality and quantity of the nutriment, under certain circumstances, often proves not only useful, but absolutely necessary, especially if strict attention is at the same time paid to the regular daily alvine and urinary evacuations. In many instances I have known patients to become feverish, irritable, and have a furred tongue whilst on a diet or purged, who were promptly relieved by quinia, porter, and beef-steak. A full diet will not answer as a universal rule; but, with attention to the state of the system before the operation, to the wasting effects of the disease or of the wound, and especially to the

purely local disorder caused by a certain class of operations, good diet will prove most useful, and the continuance of nutritious food after an operation be more serviceable than the practice of depletion before, and low diet for three or five days subsequently.

In recommending a fair or even full diet, that is, a moderate allowance of meat and ordinary food after operations, I do not wish to do more than suggest its value; circumstances must restrict its application, and in some instances do this very rigidly, as after trephining, in cataract and in hernia. But in operating for the removal of tumors in the breast or extremities, or in the case of patients who whilst in full health are suddenly injured, and especially in operations consequent on chronic diseases, a moderate amount of ordinary animal food for the first three days, and then a tolerably full diet, will often prove most conducive to a successful result, particularly when employed with judgment.

The propriety of employing a purgative at an early period after the performance of a capital operation is also a question which must be decided by the peculiarities of each case, and perhaps also by the personal experience of the operator. Like diet, purging is a point of treatment that cannot be regulated by any universal rule, but it will generally be found to be good practice, to keep the bowels free after an operation, but not to purge; these remedies having usually been sufficiently employed prior to operating.

Dr. Jno. P. Mettauer, of Virginia,¹ whose skill and experience as a surgeon are well known, advocates purging after an operation, as one of the best means of preventing an undue degree of inflammation, and especially when swelling, tenderness, and throbbing of the wound persist, the agents, by which the purging is accomplished, being carefully adopted. In gastric disturbance after an operation, or when the bowels have been previously disposed to constipation or diarrhoea, he prefers a decidedly cathartic enema (four heaping tablespoonsful of salt, to a pint of warm water). If this fail to purge sufficiently, he follows it by a purgative pill. In support of the efficacy of early purging in preventing traumatic inflammation after capital surgical operations, Dr. Mettauer states² that, out of seventy-nine operations for stone in the bladder, seventy-five were purged in from five to twelve hours after the operation, and in not

¹ Virginia Med. and Surg. Journ., No. 1, p. 1, 1853.

² *Idem.*, p. 7.

a single instance did inflammation occur in any degree beyond what was necessary for the healing of the wound. The only cases lost were the four he did not purge. In fifty-eight operations for ascites, every patient but one was purged within twelve hours without inflammation succeeding. In thirty cases of reduced strangulated hernia, in fourteen cases of vesico-vaginal fistula, and in hundreds of instances of other severe surgical operations, he has uniformly prevented undue inflammation by purging, and perfect cures followed; other means were only employed as auxiliaries.

SECTION II.

PREPARATION OF INSTRUMENTS.

Although a good operator can doubtless accomplish his object with any instrument that he can obtain, yet few would desire to neglect, or be justified in neglecting, the attentions referred to under this head. A common instrument, with a skilful workman, will do more than the best one that can be placed under the direction of an ignoramus; but even a skilful workman will obtain a more perfect result by collecting and preserving such as are requisite for his daily wants.

In this division of his general duties, the surgeon's attention should, therefore, be bestowed on the selection, preparation, manipulation, and preservation of his "mechanical therapeia."

§ 1.—*Action and Selection of Instruments.*

In selecting his instruments, every operator must be mainly guided by the wants of his own position. As a general rule, his attention should be first bestowed upon the character of the steel, its temper, finish, and shape. Very many of those who begin life in expectation of devoting themselves to surgery, commit the mistake of purchasing a cheap article instead of a good one, and soon have reason to repent of their bargains. Poor steel cannot be made to keep an edge, and constant sharpening, independently of the difficulty arising from want of skill, soon renders it useless. Good steel is a more costly article at first, but the cheapest in the end,

and, like a true friend, never fails in the hour of need. Attention to this fact is the more necessary in the United States, from the great number of surgical instruments now hawked over the country, and which, like Peter Pindar's razors, are only made to sell. Every operator should, therefore, exercise some caution in the selection of his cutler, and even with the best makers, will find some exercise of judgment necessary in obtaining his instruments. Fashion often perverts the utility of a knife as well as of other articles, and a knowledge of the action requisite in the instrument will, therefore, materially aid in its choice. To assist the decision of those who are inexperienced in this matter, special care has been bestowed on the delineation of those hereafter represented; so that any one, by consulting the plates, can see a specimen of such as are at least capable of performing their duty;¹ but in selecting all instruments, the observation of the quality of the steel, and not the brilliant appearance of the work, will tend to prevent most errors of this kind.

§ 2.—*Preparation and Sharpening of Instruments.*

Where an operator is so situated as to be able to avail himself of the services of a cutler, this portion of his duty may be advantageously placed in other hands; but, under different circumstances, or where he desires to save expense, he will soon find it an easy matter to accomplish perfectly the sharpening of the greater portion of his own instruments, and especially those which are in most constant use.

Preparatory to attempting the sharpening of any instrument, it is necessary that the principle of its action should be thoroughly understood, and that a good stone be obtained, as well as a strop or piece of soft leather.

The action of every knife is beyond doubt the same as that of a saw. No matter how fine the edge of a knife may be, a magnifying glass will show points corresponding with the teeth of a saw; and a

¹ To add to the value of these drawings, they have generally been made in accordance with the patterns of Mr. Charles Schively, cutler, of South Eighth Street, Phila., a gentleman long identified with the operative surgery of the country, and to whom many of our most distinguished surgeons are indebted for the means by which they have accomplished their most important operations.

PLATE I.

A SIDE VIEW OF SOME OF THE INSTRUMENTS EMPLOYED IN MAKING INCISIONS AND DISSECTIONS, IN THE EXTIRPATION OF TUMORS AND THE LIGATURE OF ARTERIES.

These instruments are drawn about one-half the natural size.

- Fig. 1. Small size Scalpel for delicate work.
- Fig. 2. Operating Scalpel, medium size.
- Fig. 3. Operating Scalpel, larger size.
- Fig. 4. Operating Scalpel, of greater strength.
- Fig. 5. The Silver-grooved Director. This instrument ought always to be sufficiently soft to admit of its being bent when desired.
- Fig. 6. Straight sharp-pointed Bistoury.
- Fig. 7. Curved sharp-pointed Bistoury.
- Fig. 8. Cooper's Hernia Bistoury.
- Fig. 9. Probe-pointed curved Bistoury.
- Fig. 10. Position of the Scalpel on the Hone in the first motion towards Sharpening.
- Fig. 11. The second Position of the Scalpel in Sharpening.
- Fig. 12. Savigny's Tenaculum for Ligating deep-seated Arteries.
- Fig. 13. Ordinary Tenaculum. This instrument is generally too much curved, and the present one has, therefore, been carefully selected.
- Fig. 14. Horner's Aneurism-Needle. A slip-knot is placed on the shoulder at 1 and carried around the artery without creating any obstruction from the thickness of the ligature.
- Fig. 15. Liston's "Bull-dog" Forceps.
- Fig. 16. Torsion Forceps.
- Fig. 17. Ordinary Dissecting Forceps.
- Fig. 18. Polypus Forceps.
- Fig. 19. Tumor Forceps.





saw, to cut well, must be set so as to act chiefly in the reverse direction to that in which it is drawn, seldom cutting both up and down with equal facility. The teeth in the scalpel being intended to cut by being drawn over the tissue, in a manner similar to the upward motion of the saw, their edge should be set forwards in sharpening, or from the heel to the point. In the application of the blade to the stone, such motion must, therefore, be given to it as will draw its cutting surface in this direction, the blade being kept at an angle of from 5° to 15° with the surface of the stone, so as to create the proper edge, and yet preserve the polish of the instrument. Every knife being also more or less wedge-shaped, that is, thick upon its back and tapering to its edge, the sharpness of the wedge will constitute the keenness of the blade. The flatter, therefore, the blade is placed, provided it is not below 5° with the surface of the stone, the more delicate will be the angle produced in the friction of sharpening, whilst the more elevated the back, the greater the pressure on the edge; so that, after this elevation passes an angle of 20° , it will be apt to result in a blunt, rounded or dull surface. When, then, with a good stone (and in the United States there is nothing superior to those of Arkansas or Missouri), the operator wishes to give his scalpel a keen edge, let him proceed as follows:—

Place the blade very nearly flat upon the surface of a stone, which has a smooth and well-ground face, after it is lubricated with oil, and, holding the handle with the hand in a state of semi-pronation, push the blade, with its edge forwards, across the stone (Plate I, Fig. 10); then turning the hand into semi-supination, draw it from heel to point with its edge towards the operator, over to the point of departure, bearing on lightly or heavily, according to the amount of grinding to be accomplished (Plate I, Fig. 11). As a general rule, the harder and closer the grain of the stone, the flatter the blade is applied to it, provided it is not below 5° ; and the lighter the pressure, the keener and smoother will be the edge. After repeating these movements until an edge is obtained (as may be tested by shaving the thick skin on the palm of the hand), draw the blade upon the strop or leather in the same manner as razors are sharpened for daily use, and in the reverse manner to that employed on the stone—that is, with the back of the blade presenting to the most distant end of the strop.

In sharpening pointed instruments, such as cataract needles, tro-

cars, and gorgets, the same principles hold good, although some extra attention to the shape and character of their cutting surface will be required in order properly to adapt them to the stone. As a trocar acts very much on the principle of the chisel, the mode in which that instrument is sharpened by the carpenter will answer, provided the point is kept flat to the stone—and the same manoeuvres will be applicable to cataract needles and gorgets when the edges have become very round; but under other circumstances it will be better to manipulate with them in the manner described in sharpening the scalpel.

When an instrument has acquired a rounded and blunt edge, grinding will generally be found necessary, and, in most instances, this should be confided to the cutler, though the surgeon may approximate the same end, by steadily rubbing the blade upon a coarse stone, and then proceeding to finish its edge by using one that is finer, or even a strop.

§ 3.—*Manipulation of Instruments.*

Few of the qualities of an operator are more quickly noticed by a spectator than the facility or even grace with which his movements are executed. But although this ease in manipulating is highly advantageous to the patient and a valuable accomplishment to an operator, directions in regard to it would be out of place at present, and can be more readily comprehended in connection with each operation.

The principles which should govern the movement of cutting instruments in all operations, may, however, be briefly noticed.

Scalpels, bistouries, and amputating knives, acting simply as saws, will be found to cut with the greatest facility when drawn regularly, and with moderate but steady pressure, over the part to be divided.

When, therefore, in using a scalpel, it is desirable to make a clean and smooth cut, the motion given to the instrument should be one chiefly of traction, effected by flexing and extending the thumb and fingers in very much the same manner that a pen is moved in writing, any great amount of motion in the wrist or downward pressure being unnecessary. Indeed, as a general rule, the wrist-joint should never participate in the motion of a scalpel, except when it

is requisite to change the course of an incision, or make it of extraordinary length, and even under these circumstances a neat manipulator will seldom feel the necessity of moving it. If the wrist is permitted to take part in the movement of dissecting, chopping or hacking of the tissue will usually result, or such a division of parts as might be effected by an axe, but not by a saw.

Scissors, being formed of two blades, are designed to act like two scalpels pressed together; consequently, in dividing very dense structures, a slight drawing motion enables them to cut better and with less contusion of tissue, than the exercise of any great amount of force in closing the blades.

Instruments specially required for punctures are fortunately few in number. Like the chisel, they necessarily compress or contuse the parts at their point of entrance, and should, consequently, always possess a keen edge and be introduced gradually. The stabbing motion sometimes given to trocars or gorgets is usually indicative of ignorance of these principles on the part of the operator, and nearly always induces more or less sloughing at the point punctured. A sudden elevation of the operating hand from the surface on which it should be supported, is also an error occasionally apparent in operators when using the scalpel, and especially of such as study the art of manipulating with a view to the gracefulness of the movement, rather than as an auxiliary to the perfect action of the instrument. Like a similar motion on the part of pianists, it may be deemed captivating to the observer, but as it necessarily draws the knife from the portion on which it is acting, it is worse than useless, and should be avoided. A neat operator may be characterized as a good *dissector*, who accomplishes his task with certainty and moderate quickness; and the motions of a good dissector are certainly not of the jumping order, but, on the contrary, result from the regular movements of his fingers in flexion and extension. All manipulation of cutting instruments, to be well executed, should therefore be entirely accomplished by these motions of the fingers, or by those of a hand which moves as if balanced at the wrist. The motion of the elbow can never be required in using a scalpel, and seldom with any other instrument, except the saw or amputating knife. Great flexibility of the fingers, and the power of causing three or four of those of the same hand to perform different acts at the same moment, will also add much to the neatness of a surgeon's manipulation. Thus,

the thumb, and first and second fingers, may hold the scalpel in dissection; the little finger serve as a point of support, and the third finger be made to stretch a tissue, hold back a flap, and serve as a fulcrum at the same moment—the difference of power possessed by some operators over others being often shown in the facility with which they accomplish these movements. A thick, clumsy, and heavy hand can never make a neat operator, though study of its motions, together with constant practice, may do much to remedy its defects. The ability to use the left hand nearly as well as the right is also occasionally not only an accomplishment, but also a most useful qualification in an operator, and a little practice in the daily acts of life, as in carving or dressing, will soon enable any one to acquire it.

In order to facilitate his manipulations, the operator will also find it advantageous to arrange his instruments upon a waiter or tray in the order in which they will be required for service, previous to commencing an operation.

In doing this, he should pass in review the different steps of his operation, so as to note immediately the absence of any one that may be required. By placing a napkin upon the tray, so as to prevent the blades touching any hard substance, he will also do much towards the preservation of their edges, and be prepared to act with them in the most advantageous manner. In hospital service, a board is usually kept prepared for this purpose, and will generally be found to answer very well. Upon this, the operator should spread a napkin, and then, if about to perform a circular amputation, place upon it his tourniquet and bandage, with a pin and scissors; then the amputating knife; then a scalpel to dissect back the skin; then a small catlin for the inter-osseous space, if the limb has two bones; next, a retractor to protect the soft parts when sawing the bones; then the saw; next, the bone nippers, and then the tenaculum and ligatures. It is also a good rule to have at least two of all such instruments as are liable to be injured or rendered unfit for service during an operation.

Some surgeons, especially in public institutions, very properly confide the arrangement of their instruments to an assistant; but, when this is done, they should carefully overlook the tray before commencing the operation. Another tray, containing the anæsthetic, the bandages and other portions of the dressings, as sponges, basins, and stimulants, should also be close at hand; and if the room

admits of it, one tray may be placed so near the operator that he can help himself to his instruments. But, if this is not desired, a special assistant may hand them to, and receive them from him, according to directions which should always be given previously; no other person being allowed to touch either board, after the commencement of the operation, lest confusion be created, by several persons attempting to reach them at the same moment.

§ 4.—*Preservation of Instruments.*

A few words in relation to this apparently simple portion of an operator's general duties may, perhaps, save the younger surgeon some vexation. No matter how finely polished instruments may be, as received from the cutler, unless an operator is attentive to this minor point, he will soon find them out of order. Thorough cleansing after operating is, of course, essential to their preservation, and every surgeon should, therefore, either wipe and thoroughly dry his instruments himself before putting them away, or examine them closely, if the duty is performed by another.

In keeping instruments ready for use, attention to the place of deposit is also necessary; as sometimes there is a slight dampness in a closet, which will soon tell even when the cases are closed perfectly, and which will be certain to create rust when instruments are put away without a case. Even in a warm and apparently dry room, I have known my eye instruments to be so affected by moisture as to become rusty. A practice which is pursued to some extent in the preservation of instruments, is also one which frequently destroys or impairs their utility, viz., oiling or greasing them, when replaced in the case. This custom, as well as that of anointing the blades with mercurial ointment, may serve a good purpose on board ship or near the sea-shore if very lightly done; but, under ordinary circumstances, the development of acid in the chemical change of the article, especially when it becomes rancid, will soon do quite as much towards rusting a blade as a damp atmosphere. The most certain preservative in my experience has been, first, to render each instrument perfectly dry; second, to keep it well wrapped in soft paper or cotton; and third, to place it in a close box, and wrap this thoroughly in hardware or thick brown

paper. These precautions, however, can only be required by such instruments as are not in constant use.

As the author has been often consulted in relation to the kinds of instruments most likely to be required by a young surgeon commencing practice, he has selected the following as embracing in a small space a sufficient amount for most of the operations (excepting amputation, stone, trephining, and eye cases) that he may be called on to perform. It contains all that is essential for the extirpation of tumors, ligature of arteries, hernia, fistula in ano, hemorrhoids, and polypus narium, and is known among some of the cutlers as his "Minor Case." It consists of 1 Probe-pointed curved Bistoury. 1 Hernia Bistoury. 1 Sharp-pointed straight Bistoury. 4 Operating Scalpels of different sizes (1 large, 1 medium, and 2 smaller). 1 Tenaculum. 1 Savigny's Tenaculum. 1 Pair of Dissecting Forceps. 1 Eyed Probe—all in a tray.

1 Physick's Forceps and Needle. 1 Polypus or Short Forceps. 1 Tumor Forceps. 1 Pair small Bone Nippers. 2 Curved Spatulæ. 2 Coils annealed Wire. 3 straight and 3 curved Needles. 1 dozen Harelip Pins, of steel, like ordinary needles. 1 Horner's Tenaculum, for hemorrhoids—in the bottom of the case.

1 pair sharp-pointed Scissors. 1 Silver Director. 1 Double Canula of Levret, for polypus. 1 Physick's Canula (small) for hemorrhoids—in the top of the case.

The cost of all these instruments, including the case, should be about \$22.

SECTION III.

THE OPERATOR'S DUTIES TO HIS ASSISTANTS.

In every important operation, the value to the patient of the services rendered by good assistants may be regarded as nearly equal to those of the operator, the responsibility of the surgeon being much increased, and his labor greatly augmented, when compelled to act by himself. In addition to their ordinary duties, the necessity for one of them taking the principal part, also occasionally occurs, as in the event of cramp or embarrassment in the operator; and under such circumstances a good assistant is essential to the welfare of the patient.

Every operator should, therefore, thoroughly reflect upon the character and qualifications of those whom he selects to assist him, as well as upon the duty they may have to perform, choosing them not only with reference to the physical, but also to the moral, support that they can furnish him. A doubt may arise as to the character of the tissue operated on, or as to the propriety of continuing the operation; and in all such cases the decision of the question will depend, to a considerable extent, on the skill and judgment of the assistants, if they happen to be medical men.

§ 1.—*Selection and Instruction of Assistants.*

In selecting assistants, every surgeon will of course be guided by his peculiar position; but if he can obtain the services of his professional brethren, and especially of those with whom he is on intimate terms, he will doubtless select them. Where, on the contrary, this is not the case, and he is compelled to resort to strangers, and especially if, in addition, they are to be selected from the friends of the patient, he should be especially cautious in his choice. Many who are very brave before an operation, find their sang-froid fail them after a little blood is lost. Others are sickened by smells or by the flow of blood, and rendered worse than useless, by requiring for themselves the attentions that are due to the patient. Others, again, even among medical men, are so little conversant with the details of operative surgery as to require instruction, or, when this is not necessary, are so clumsy in the use of their fingers as to put them constantly in the wrong place. Very few general practitioners are able to tie a ligature as quickly as a surgeon, simple as it appears to be; and an operator should, under such circumstances, anticipate extraordinary difficulties, and prepare himself to meet them. As, however, it is impossible to give more than general directions on this subject, the surgeon must regulate his action according to the wants of the moment.

One rule may certainly be laid down as applicable to all cases, even when the surgeon is fortunate enough to be aided by the presence of those on whom he can rely, and that is, always to explain to all who are to participate in the operation, the method to be pursued, and the special duty that will be assigned to each, before commencing to operate. Few operations in surgery are so limited

in their character as to be amenable to any universal law, and the peculiar views of each operator should therefore be distinctly expressed, even to his colleagues, before the operation is commenced. And though surgeons may differ in opinion as to the advantages of one method over another, the professional assistant should remember that, as the chief responsibility of the case rests on the operator, it is for him, and him alone, to decide which plan he will adopt. In all cases, where surgeons meet in consultation, these differences will be made to harmonize, or be yielded to, previous to the commencement of the operation; but under few if any circumstances, should an assistant express his individual opinion of a plan of proceeding whilst the operator is engaged in the use of the knife. Marked ignorance of structure, on the part of an operator, might justify a surgeon of more extended experience in calling the operator's attention to anatomical points, or to matters likely to risk the life of the patient. But as every operator doubtless has his own views of the case, as well as of the best plan of operating, he should not be troubled by useless conversation, or unnecessary fingering of parts, or other inconsiderate or perhaps conceited interference among those around him. I would, therefore, offer this as a rule for all assistants, viz: That they limit themselves strictly, both in word and deed, to the duty assigned them, except in cases of extreme emergency. On the other hand, I would urge all surgeons to remember that it is for the benefit and comfort of all parties, that they should subsequently endeavor so to arrange their own movements as not to encroach upon the duties previously assigned to others. Occasionally, good surgeons err in this manner, and delay their operations by endeavoring to do everything themselves, instead of relying upon their assistants for the performance of the share previously assigned them. When good assistants are to be obtained, let them by all means be trusted, and the patient will be sure to benefit by the division of labor.

The instructions and special duties of assistants will be referred to in connection with each operation.

CHAPTER II.

ELEMENTARY OPERATIONS.

UNDER this head are embraced such general manipulations as constitute the primary portion of every operation, and especially of those necessitating a division of the integuments ; such, for example, as Incisions and Dissections, arrest of Hemorrhage, together with the closing of the part and its Dressing. Although every surgeon, in passing through his anatomical studies, necessarily acquires a certain degree of skill in making incisions and dissections, yet a recapitulation of the ordinary rules required for their proper performance may correct such faults, either of carelessness or ignorance, as have been unwittingly acquired. The details of each act, and the varying positions of the knife usually described by French writers, have, however, little of sufficient value to justify their repetition, except that the employment of a numerical system in the position of the scalpel is advantageous by saving repetition in the description of the same act in different operations.

SECTION I.

INCISIONS WITH THE SCALPEL, OR BISTOURY.

The Scalpel usually employed in operating, resembles in most points that generally found in the dissecting case. Its function is, indeed, the same in both instances, though in operating, as in dissecting, there is a difference of opinion as to the best shape of its blade, some surgeons preferring one that is somewhat angular towards the point, and others liking it better when made with a greater degree of convexity. In either case, the blade should be firmly fastened to the handle, and the latter made plain and tolerably smooth, not only because this is more favorable to accuracy of touch, but also because it can be more readily cleansed. On the latter account, the serrated handles sometimes placed on scalpels are objectionable.

PLATE II.

THE SIX POSITIONS OF THE HAND AND SCALPEL, EMPLOYED IN
MAKING INCISIONS AND DISSECTIONS.

Fig. 1. *The First Position of the Scalpel.* The scalpel is held as a carving-knife, so as to cut from without inwards. In this position, the thumb and radial side of the second finger should be placed at the rivets in the handle, whilst the ring and little finger shut the back of the handle into the palm of the hand, and the forefinger rests upon the back of the blade. The further this finger is extended upon the blade the greater will be the amount of force that can be employed by the operator.

Fig. 2. A View of one Method of Incising the Skin with the Scalpel in the First Position. A fold being raised and rendered tense by the left hand of the surgeon and the right hand of an assistant, and the incision made by cutting from without inwards.

Fig. 3. Another Method of Incising the Skin. The parts being made tense by the thumb and forefinger of the surgeon's left hand.

Fig. 4. *The Second Position of the Scalpel*, or the reverse of the first. In this position, the thumb and forefinger should be placed at the sides of the handle near its junction with the blade, and the middle, ring, and little fingers be employed in grasping the handle. A fold of the skin being raised, is to be punctured and then incised from within outwards, when the knife is held in this position.

Fig. 5. *The Third Position of the Scalpel.* In this position, the scalpel is held as a pen between the thumb and first two fingers, whilst the hand is supported and steadied by the other fingers. The tissues to be divided are held by the forceps, and the scalpel made to divide them simply by flexing and extending the fingers.

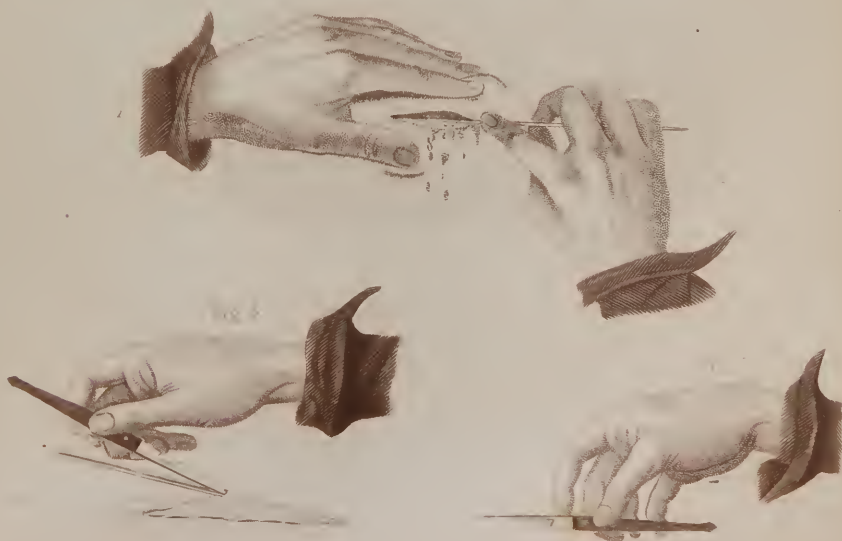
Fig. 6. *The Fourth Position* is the reverse of the last. The scalpel being held as a pen, but with its edge from the surgeon, so as to cut only by extending the fingers.

Fig. 7. *The Fifth Position of the Scalpel.* In this position, the scalpel is held as a "fiddle-bow," the pulps of the four fingers being extended in a line along one side of the handle, and the thumb placed on the opposite side so as to correspond with the line of the fingers. This position is a very easy one, and gives great lightness and delicacy to the incisions.

Fig. 8. *The Sixth Position of the Scalpel.* In this, the scalpel, or straight bistoury, is held with the fingers flexed, and with its edge towards the hand. The left hand in this position generally holds the director, which is kept stationary, whilst the right passes the knife along its groove.



Fig.



The most common positions of the scalpel, in operating, are the six following, as employed by the French surgeons:—

FIRST POSITION.—Hold the scalpel in the position of a carving-knife, that is, with the handle in the palm of the hand and the forefinger pressed upon the back of the blade, and make the incision by bearing firmly on the blade with the forefinger (Plate II., Fig. 1). This position gives the operator an opportunity of exerting considerable force, and is well adapted to the first incisions in dense tissues, as in excising a scirrhus breast, or in the removal of an osseous or fibrous tumor, or in the division of ligaments or tendons and muscles, in disarticulating joints. When it is desired to render the skin tense and make the external incision in a certain line, the integuments should be steadied as represented in Plate II., Fig. 2.

SECOND POSITION.—Hold the scalpel with its edge upwards, and, puncturing a fold of the skin, incise it from within outwards, by elevating the point with the thumb and finger, pressing the handle against the palm with the other fingers (Plate II., Fig. 4). Previous to employing the scalpel or bistoury in this position, an assistant should be directed to raise a fold of the skin so as to free it from the subjacent parts. When the integuments are thus divided, there is but little risk of injuring deep-seated parts, and also less pain caused to the patient than when the incision is made from without inwards, as in ordinary dissection, or in that represented in Plate II., Fig. 2, where a fold is raised and incised from the outside.

THIRD POSITION.—Hold and move the scalpel very much like a pen, the point and edge being pressed downwards with sufficient firmness to enable them to divide the parts to the desired extent. In commencing an incision, the point of the blade should be inserted into the tissue by a perpendicular pressure of the fingers in an extended position, and the knife drawn firmly towards the operator by strongly flexing the fore and second fingers (Plate II., Fig. 5), the incision being terminated by a perpendicular pressure of the blade at the point where it is wished to stop, in order to prevent the irregular scratch of the skin, or that mark which the French call “a tail.”

FOURTH POSITION.—Hold the knife nearly in the same position as a pen, but with its cutting edge upwards, so as to cut from the operator (Plate II., Fig. 6). Both this and the third positions are constantly required in every operation in which dissection is necessary, as in the removal of tumors, ligature of arteries, &c.

PLATE III.

A VIEW OF THE DIFFERENT INCISIONS, AND OF SOME OF THE MEANS OF CLOSING THEM AND ARRESTING HEMORRHAGE.

Fig. 1. Signoroni's Tourniquet, for arteries which are placed near bony depressions.

Fig. 2. Bellingham's Compressor for the treatment of aneurisms.

Fig. 3. The Pear-shaped Caутery.

Fig. 4. The Button-shaped Caутery.

Fig. 5. Physick's Forceps and Needle.

Fig. 6. The "Spanish Windlass," or Garrot, made by twisting a handkerchief with a short stick.

Fig. 7. A front View of the Abdomen, showing the shapes of different incisions. 1. The V-shaped incision to form a single flap. The first incision being made, the second line should commence at the proper distance from the first, and terminate like the first. The flap is to be reverted from the point of the V. 2. The T-shaped incision to form double lateral flaps. Make the horizontal cut, and then let the vertical incision terminate near the middle of the first cut. 3. An C-shaped incision. The vertical cut being first made, the two horizontal ones should be made to terminate at each extremity. 4. The H-shaped incision. The middle, or horizontal cut being first made, the two vertical ones should be carried across its ends, so as to form two broad flaps. 5. The crucial incision. This may be made either by uniting the points of two V-shaped incisions, or by elongating the vertical portion of a T. 6. The crescentic incision. 7. An elliptical incision made by joining the ends of two crescentic cuts.

Fig. 8. Different kinds of Harelip Pins. 1. Three pins made of steel, or simply wire, sharpened at one end. 2. The harelip pin with the movable point.

Fig. 9. Small size Bone-nippers, employed to cut off the ends of the pins, &c.

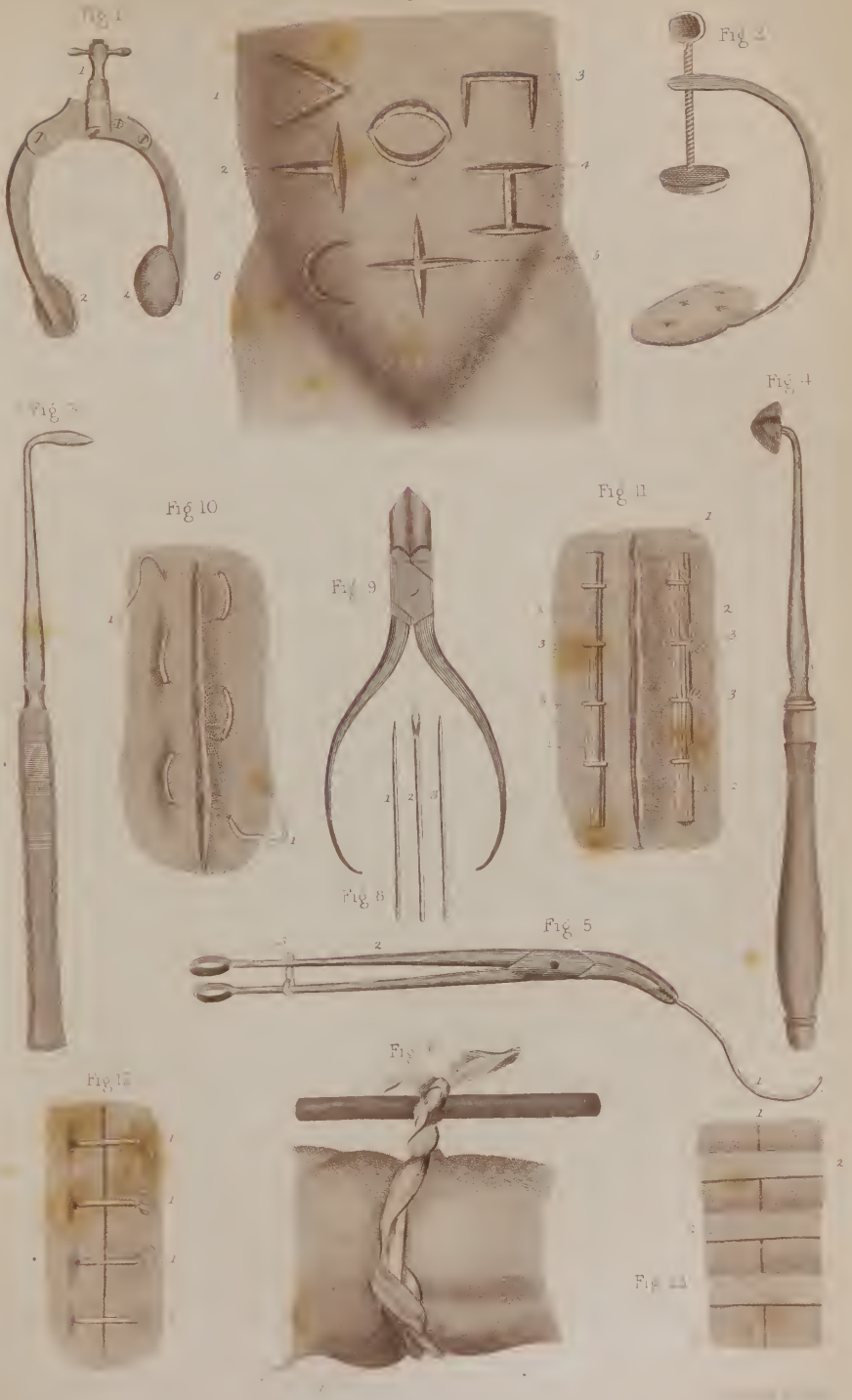
Fig. 10. A peculiar Form of the Continued or Glover's Suture, occasionally useful in deep muscular wounds.

Fig. 11. The Quilled Suture. 1. The wound. 2, 2. The quills. 3, 3. The sutures tied around the quills so as to approximate the sides of the wound.

Fig. 12. Several points of the Interrupted Suture. The knots should always be tied as at *l, l, l* at the sides, and not over the line of the incision.

Fig. 13. Union of a Wound by Adhesive Strips. 1. The line of the wound. 2. The strips applied at regular distances.

Fig 7








FIFTH POSITION.—Hold the scalpel by placing the thumb on one side of the handle while the four fingers are approximated on the other, like the position of a fiddle-bow (Plate II., Fig. 7). This position is well calculated for incisions requiring delicate touches of the knife, as in the division of tissues over hernia, large vessels, and other important parts.

SIXTH POSITION.—Hold the scalpel or bistoury with its edge to the palm of the hand, so as to cut towards the operator; the tissue to be divided, if near important parts, being raised upon a director (Plate II., Fig. 8).

The multiplication of these positions of the scalpel may be carried to any extent, but those most frequently required will be found to be such as have just been detailed.

In every case where dissection is requisite, it is important that the parts to be divided should be kept upon the stretch, either by holding them with the forceps (Plate II., Fig. 5), or, where the portion is of sufficient size, by seizing them with the thumb and fingers of the hand opposite to that which holds the scalpel (Plate II., Figs. 2, 3, and 4).

Wherever, in incising the skin, it is desirable to make a regular and smooth cut, the integuments in the neighborhood should be kept quite smooth, or prevented from yielding before the pressure of the scalpel, either by the operator placing his thumb on one side of the line of incision, and his fingers on the other, Plate II., Fig. 3, or by employing the hands of assistants. In limited incisions, the left hand of the operator is sufficient; but in those of greater extent, as in the removal of a breast or large tumor, those of assistants will be necessary. As the first incision generally causes the flow of blood, one of these assistants may, at the same time, sponge the part so as to facilitate the operator's view of the structure.

Incisions may be made of various shapes, thus: a single line constitutes what has been termed a simple incision, and that formed by two or more lines a compound one. These compound incisions may be modified to any extent, but usually they are formed by the arrangement of straight lines, so as to form cuts like the letters **V**, **L**, **T**, or **H**, or **U**, or as a **+**, or of curved lines, as the crescent  or ellipse , or double crescent  (Plate III., Fig. 7). By these and similar incisions, the skin may be divided into various flaps, which, being subsequently freed from the subjacent parts by dissec-

tion, will enable the operator to act according to his pleasure. An important rule in all these incisions is *to make them sufficiently long*, or even too free at the first cut, as the skin usually heals readily, and a free primary incision facilitates very much the subsequent dissection. Another useful rule in connection with incisions, especially in parts where the cicatrix will afterwards be apparent, as in the face, or on the neck and shoulders of young females, is to make them so that the scar may come in the course of the contractions of the fibres of the neighboring muscles, by which means the cicatrix will be hid in the natural folds of the skin; thus, on the forehead, the incision in the skin should, if possible, be transverse, so as to correspond with the wrinkles created by the occipito-frontalis muscle; on the cheeks, in the line of the levator anguli oris or levator labii superioris *alæque nasi*; and on the neck, in front of, or behind, but in the line of the sterno-cleido-mastoid muscle.

Incisions, or the division of parts by the Scissors, require but a few words, as the necessity for employing them is rarely met with. Whenever scissors are to be used for incising parts concerned in operations, they should be held by placing the last joint of the thumb through one ring, and that of the second or third finger through the other, the index or second finger being placed on the side or above the blades. The preference should, however, be given, in most instances, to incisions made by the scalpel, provided there is a sufficient basis of support, as the latter will generally make a cleaner cut, owing to their being susceptible of a keener edge than scissors, which, in the United States, are often imperfectly made even by the best cutlers. The incisions of bone by the saw or bone-nippers may be classed under those of the scalpel and scissors, but will be again referred to in connection with the operations on the bones.

SECTION II.

DISSECTIONS.

Dissections, as performed by a surgeon, constitute the greater portion of his operative manœuvres; but, as they do not vary from those employed upon the dead subject, the same general rules are applicable both to them and to the ordinary dissections of the anatomical rooms. 1st. Stretch the part to be divided, and render it perfectly tense. 2d. Incise it by a long steady sweep of the scalpel in the third position, with a motion similar to that made in forming large letters with a pen. 3d. Remove the blade of the knife as seldom as possible from the line of incision; so as to avoid scratching, digging, piercing, jerking, or notching the tissue. 4th. Obtain in the case of tumors a good hold upon them, before commencing their dissection, either by passing a needle and ligature deeply through the part, so as to form a loop, or by seizing them with the forceps known as Liston's "Bull Dog" (Plate I., Fig. 15), or with the tumor forceps (Plate I., Fig. 19), or with a tenaculum, or with the ordinary dissecting forceps, according to the size and structure of the portion to be excised. The looped ligature, being the firmest, will in most instances prove the best adapted to this purpose. If, in the course of a surgical dissection, the tissues to be divided involve parts of delicacy and importance, it will be better to employ the director and bistoury, as is shown in the sixth position of the scalpel (Plate II., Fig. 8), for their incision, than to trust to the ordinary motion of the knife, unless the operator is very sure of a steady and light hand. The support of the hand to be obtained by resting the ring and little finger upon surrounding parts, in the third position of the scalpel (Plate II., Fig. 5), will, in these dissections, prove of great service.

When, in the course of an ordinary operation, small arteries are divided, it becomes a question whether the operator should stop in order to take them up, or whether he should not proceed rapidly to accomplish his object. In deciding this question, much must depend upon circumstances; but, as a general rule, if the part is superficial and the arteries of no great size, as is the case in most operations on the breast, or in removing tumors elsewhere, the

surgeon may finish his dissection before attending to the hemorrhage, or direct an assistant to compress or twist the vessels as they spring, or put his finger on them; as it often happens that, before the termination of the operation, the contraction and retraction caused by the stimulus of the air, or the effect of the latter on the liquor sanguinis, will be sufficient to arrest the hemorrhage. If, in the dissection of complicated or deep-seated parts, the first assistant cannot by sponging keep the part free from blood, or if the patient will not be benefited by the depletion, then the operator had better stop and ligate the vessels before proceeding with his operation.

SECTION III.

PUNCTURES, OR INCISIONS WITH POINTED INSTRUMENTS.

When tissues are divided by the direct pressure of a pointed instrument, it constitutes a puncture. Punctures may be made with a scalpel, but more frequently they are created by the use of the lancet, sharp-pointed bistoury, or trocar. In making punctures with either of these instruments, the depth may, if requisite, be regulated by seizing the blade near the point, between the forefinger and thumb. On introducing either the Lancet or Bistoury in making a puncture, the blade may simply be withdrawn by a movement which is the reverse of that which introduced it, or the handle may be depressed towards the surface, and the point made to cut its way out by incising the tissues from within outwards. The Trocar should be held with the handle supported against the palm of the hand, and then forcibly pressed through the tissue that it is intended to perforate. As every trocar is usually surrounded by a Canula or tube for the evacuation of the fluid, attention should be given to the free motion of this tube upon the blade previous to operating, lest, after its introduction, it be found impossible to separate the trocar from the canula.

CHAPTER III.

MEANS OF ARRESTING HEMORRHAGE.

AFTER every application of the knife in operating, the necessary division of vessels gives rise to hemorrhage, which may or may not require attention before the surgeon proceeds with his operation. In the extirpation of tumors, there is a diversity of opinion among operators in relation to the advantages of tying each vessel as it is divided. The late Dr. George McClellan, of Philadelphia, who was a bold operator, seldom deemed it necessary to attend to the hemorrhage in extirpating the mammary gland or other tumors not involving the main arteries, until ready to dress the wound; and Dr. Gross, of Louisville, has recently¹ expressed a similar opinion, "seldom or never stopping to tie a vessel during any operation, however extensive or complicated, his experience having taught him that there is in general no necessity for such a course, which is always attended with vexatious delay and annoyance." My own experience has led me to the same conclusion, the action of the air and contraction of the vessels having often enabled me to omit ligatures which would certainly have been applied at the moment the arteries were divided. In the extirpation of tumors this latter point is certainly of some consequence, by favoring the speedy union of the divided parts. I have seen from fifteen to twenty ligatures employed in the excision of a breast, in consequence of their prompt application to every arterial branch that bled, and also seen cases where not more than two were required to check such hemorrhage as existed at the close of the operation. These superficial vessels often appear to discharge blood very freely, whilst, in reality, the whole amount thus lost in tumor operations would not reach ten ounces, a quantity which is often beneficial rather than injurious to the future condition of the patient. But if the patient is enfeebled, or the amount of hemorrhage should exceed ten or twelve ounces, it will be safer to employ some means to regulate the quantity that

¹ Western Journ. Med. and Surg., vol. x. p. 201.

PLATE IV.

ARREST OF HEMORRHAGE BY THE LIGATURE AND COMPRESSION OF ARTERIES.

Fig. 1. A side view of a stump, showing the method of ligating an artery. 1. The open mouth of the artery. 2. The tenaculum drawing the artery out of its sheath and away from the soft parts. 3, 3. The two knots of the ligature passed over the tenaculum, and about to surround the artery. Both knots of a ligature should be firmly tied upon the vessel before the tenaculum is withdrawn.

Fig. 2. The effects of torsion upon an artery. 1. The twisted portion of the artery. 2, 2. The effects of the Torsion upon the inner and middle coat of the vessel. 3. The external coat uninjured.

Fig. 3. The effects of the application of the Ligature. 1. The ligature as applied. 2, 3. The internal and middle coat cut by the ligature. 4, 5. The external coat, which sustains the ligature after the other coats are ruptured, is seen all round the vessel.

Fig. 4. The result of the application of the Ligature. 1. One of the anastomosing branches. 2. The conical clot forming in the vessel, and extending to the first anastomosing branch.

Fig. 5. A View of the enlargement of the Anastomosing Branches, and of the contraction of the Main Trunk after the application of a ligature. The drawing represents the cure of a popliteal aneurism. 1. The main artery above the aneurism. 2, 2, 3, 3. The enlarged anastomosing branches.

Fig. 6. The application of the Tourniquet of Petit; a pad should be placed over the course of the artery, and a bandage carried over it, and around the limb, to prevent the strap of the tourniquet from chafing the skin. The tourniquet, with its plates closed, should then be placed directly over the pad which is on the artery, and the strap buckled tight, so that the separation of the plates when the screw is turned, may cause the pressure of the instrument to come directly upon the pad and the artery. The pad under the buckle is solely to prevent its injuring the skin, and has nothing to do with the compression.

Fig. 7. Compression of a main artery (the femoral) by the thumbs.

Fig. 8. Surgical Curved Needles.

Fig. 9. Surgical Needles of a different shape.

Fig. 10. The Harelip Suture.—A. 1. The wound. 2. The introduction of the pin. 3. The twisted suture thrown around the pin.—B. The suture as completed—the integuments being protected from the pressure of the ends of the pins by an adhesive strip.

Fig. 11. A side View of a Curved Spatula. This instrument is made of copper or steel, plated, and has two curves adapted to wounds of different depths.

Fig. 12. Levret's Double Canula, with a wire ligature, and applicable to polypi.



will be discharged. These means may be classified as those which are proper before commencing the operation or before any incision is made, and those demanded subsequent to or during its performance. Among the first and simplest may be placed such a position of the part as will prevent the afflux of blood; second, compression; and third, the employment of ligatures, cauteries, and styptics.

SECTION I.

COMPRESSION.

The prevention of hemorrhage by means of compression is a purely mechanical result, which may be accomplished either by applying the thumb or fingers over the course of the main artery supplying the part—a mode of compression that, with good assistants or with a skilful surgeon, may be pursued with perfect success—or by the use of tourniquets.

In practising compression with the hand upon the arteries of the extremities, the thumb should be placed directly upon the vessel, and pressure made against the bone, by placing the thumb over the artery on one side of the limb, and grasping the other side with the fingers; or by placing one thumb on the vessel, and pressing upon it with the other, as seen in Plate IV., Fig. 7. Where the artery is so situated as to render the application of the thumb difficult, as in the subclavian or external iliac arteries, pressure may be applied by means of a common door key, well wrapped around its handle with muslin or flannel, and then placed over the artery, the wards of the key being held in the hand. The advantages claimed for arterial compression, as thus practised, is the non-interruption of the general venous circulation of the part, the course of the blood in the artery being alone obstructed.

The next means of arresting the circulation is by the Garrot or Spanish windlass (Plate III., Fig. 6), a contrivance which, from its simplicity, has much to recommend it. It may be formed at a moment's notice, by twisting a handkerchief into a cord, tying a knot in its middle, applying the latter over the course of the artery, and then tying the free ends loosely together, introducing a stick into the loop of the handkerchief, and twisting it tight. An additional recommendation of this instrument is, that patients may be taught

to employ it themselves, a matter of importance in military surgery. The tourniquet of Petit (Plate IV., Fig. 6), or Bellingham's compressor (Plate III., Fig. 2), also answer very well when applied to the extremities, and will be again referred to under the head of amputations and aneurisms. At present, the Figures explain themselves sufficiently well. A very simple method of compressing only the arteries of a limb, and one easily practised, will be found in the plan proposed by Dr. Physick, in the case of hemorrhage from the foot. A compress was first applied over the anterior tibial artery, and another over the posterior tibial, about two inches above the ankle; over these a strip of sheet copper (or tin) was passed round the leg, and then a tourniquet applied over the copper. By tightening the tourniquet the arteries were compressed, and the bleeding arrested, whilst the rest of the circulation was not interrupted.¹

A special tourniquet, or Compressor, as it has been named, has lately been brought forward by some one in the Eastern States, and is a useful instrument for the compression of deep arteries. It is figured in Plate III., Fig. 1, but is evidently a repetition of Signoroni's tourniquet, or of that of Dupuytren. It is especially applicable to the axillary and iliac arteries, or where it is desirable to compress only two points of a limb. It consists of two semicircular sections, jointed at one end, and made to move upon each other by means of a ratchet piece which is acted on by a key. Pads are attached to the opposite ends of each section, and they are thus made to press directly upon the points to which the instrument is applied. Compression for the arrest of hemorrhage either previous to, or during an operation, should, however, be applied only for a limited time, lest it induce mortification. When more permanent means are necessary, the surgeon should resort to direct applications to the wounded vessels, and employ the ligature or torsion.

SECTION II.

ARREST OF HEMORRHAGE BY LIGATURES.

In no instance, after a severe operation, can a surgeon feel himself secure against the risks of hemorrhage, unless he has taken care

¹ Elements of Surgery, by John Syng Dorsey, M. D., vol. i. p. 61, Phila. 1823.

to ligate each vessel thoroughly. To accomplish this, it is necessary that he should resort to some means of seizing the bleeding orifice, such as a tenaculum (Plate IV., Fig. 1), artery forceps (Plate I., Fig. 16), or curved needle (Plate IV., Fig. 8). The tenaculum is intended to hook and draw out the vessel from surrounding parts, and is the instrument most frequently employed in this country. The artery forceps performs the same office, but is not so much esteemed on this side of the Atlantic, as on the continent of Europe. The curved needle is applied to vessels that shrink in among surrounding parts, or where the bleeding orifice cannot be readily found, or where the portions immediately around the point of hemorrhage must be indiscriminately ligated in order to control the bleeding.

Without entering into the physiological effects of the application of ligatures to arteries, it may suffice to say, that it is necessary, as established by Dr. J. F. D. Jones,¹ that the ligature should be drawn with sufficient firmness to cut through the internal and middle coat of the vessel (Plate IV., Fig. 3), and that sufficient inflammatory action be established within the artery to glue its sides together, and render the channel impervious. If the artery is diseased, care must be exercised lest the force thus applied cause the ligature to cut through the vessel before adhesion has occurred. In order to obviate such an event, it has been advised to employ a broad ligature, or, as Manec suggested, to introduce a piece of bougie into the vessel in order to diminish the pressure upon the coats, or to employ a portion of the adjacent muscle, as has been done by Dr. Mütter, of Philadelphia.

When an artery in the healthy condition is to be tied, the surgeon should proceed as follows: seize the open end of the vessel with a tenaculum, by inserting the point of the instrument into its coats, draw it out of its sheath, and separate it as much as possible from the surrounding tissue, especially from the accompanying nerves (Plate IV., Fig. 1). Should the latter be included, it may give rise to violent neuralgic pains, or create neuromatous tumors, or, by causing the ligature to remain for a long period in the wound, interfere with the process of cicatrization.

Then let an assistant pass the middle of the ligature beneath the tenaculum, and, bringing its two ends around the vessel, form a

¹ Treatise on Hemorrhage and the Use of the Ligature, with Observations on Secondary Hemorrhage. London, 1805.

loop, and drawing upon the ends with his fingers, tighten the knot with the points of his thumbs, in the same manner that a cobbler draws his ends, taking care that the knot passes below, and not above the point of the tenaculum, and that it is drawn with sufficient firmness to accomplish the division of the arterial coats recommended by Dr. Jones. A second knot being then tied in like manner, one end of the ligature should be cut off within about a quarter of an inch of the knot; the other brought out at an angle of the wound, and the tenaculum removed. Some surgeons remove the tenaculum before the second knot is formed, but it is a dangerous practice, exposing the patient to the risks of secondary hemorrhage from the ligature being imperfectly applied. Subsequently, on closing the wound, all the free ends of the ligatures should be brought out at the lowest point, where they will favor the escape of pus, and thus prevent the formation of abscesses. Various knots, some of which have been designated as the "surgeon's knot," &c., have been recommended for tying ligatures, but the ordinary double knot is all that is absolutely necessary in most instances.

The advantage of cutting off one end of the ligature will be found in the diminished amount of foreign matter necessarily left in the wound until the ligatures separate, and this is now the general custom of surgeons in the United States. "The practice of removing both ends close to the knot, published by Haire, of England, in 1786, was adopted by Hennen in 1813, at the suggestion of one of his associates, who believed it to have been an American invention;"¹ but if this were so, it was probably at the period when animal ligatures were used, as the practice revived by Veitch in 1806 has long been the only one employed in this country.

The ligature, thus applied, closing the vessel, arrests the passage of the blood beyond it, and a clot is formed (Plate IV., Fig. 4), which, gradually rising as high as the first anastomosing branch above the ligature, causes the blood to pursue a winding course around it, by dilating the collateral branches until at last it enters the main trunk at a distance below the ligature. As this clot contracts adhesions to the sides of the artery, its more liquid portions are absorbed, and the vessel closing upon it, is soon converted into a ligamentous cord, the amount of blood formerly transmitted through the artery being now carried by the enlarged anastomosing vessels. (Plate IV., Fig. 5.)

¹ South's Chelius, vol. i. p. 339, Philada. edition.

The substance of which the ligature should be made, and its mode of action, were formerly points of great interest to operators, and, under peculiar views, it was deemed necessary that they should be made of chamois skin, kid, buckskin, the tendon of the deer, catgut, parchment, or lead, as suggested by Drs. Physick, Hartshorne, and Dorsey of Philadelphia, and Jameson of Baltimore.¹ But, of late years, the simple silk or hemp thread has been found to answer every purpose, and is now almost universally resorted to.²

TORSION is effected by seizing the end of the artery in forceps, and twisting it by rotating the instrument between the fingers and thumb, until the internal and middle coats are lacerated. (Plate IV., Fig. 2.) Torsion is a favorite means of arresting hemorrhage among the French surgeons, but much observation has convinced me that it cannot be relied upon except in the case of small arteries.

The credit of suggesting torsion for the arrest of hemorrhage has generally been assigned to Amussat, of Paris, who published his account of it in August, 1829.³ Dr. Bushe, of New York, has, however, disputed this claim, assigning the origin of it to Guy de Chauliac, and quoting cases of his own, where, in December, 1826, April, 1827, June, 1827, and July, 1828, he employed torsion "by twisting the cut extremities of the vessels in a square-beaked forceps, furnished with a sliding bar, and two nuts."⁴ The credit of suggesting this method of arresting hemorrhage belongs, therefore, neither to Amussat, nor Bushe, though the latter is entitled to the merit of having recalled the attention of the profession to this plan.

SECTION III.

STYPTICS, CAUTERIES, AND OTHER MEANS OF ARRESTING HEMORRHAGE.

Among the older surgeons, much confidence was placed in the employment of styptics for arresting hemorrhage; but, at present, American surgeons seldom resort to them, except in cases where

¹ Dorsey's Surgery, vol. i. p. 53, Philadelphia, 1823.

² For the manufacture of ligatures, see Smith's Minor Surgery, 3d edition, 1850.

³ Archives Générales, tome xx. p. 606.

⁴ New York Medico-Chirurgical Bulletin, vol. ii. p. 212.

the ligature cannot be applied, as in oozing from a general surface, or in bleeding from the cancellated structure of bone.

In such cases the articles occasionally employed as styptics are the nitrate of silver, sulphate of copper, alum, tannic acid, tinctura ferri chloridi, and matico, either in leaf or tincture, nearly all of which act by constricting the vessel. Hemorrhage may also be arrested by the application of either fine sponge, or dry lint, so as to favor the formation of a clot at the end of the vessel. This, when combined with pressure, occasionally answers a good purpose.

The heated iron, or Actual Cautery, though seldom resorted to, may be demanded in operations upon the bones of the face, or in other positions where the bleeding point cannot be seen. In order to adapt the cautery to these surfaces, a great variety of shapes has been given to it, but those represented in Plate III., Figs. 3, 4, are all that are generally necessary. When a cautery is to be employed, it may be heated either to a white or red heat by fire, or kept plunged in boiling water. White heat will form an eschar which, on separating, is likely to bring on secondary hemorrhage; but the red heat will only produce contraction of the vessels and tend to produce adhesive inflammation. The propriety of using the actual cautery in either of the conditions referred to may, however, be regarded as doubtful. The nitrate of silver, or tincture of iron, or plugging the part with dry lint, is all that is generally found necessary, surgeons usually preferring to apply a ligature, or resort to cold for a temporary arrest of the more serious bleeding, or leave the wound exposed to the air for one or two hours, as suggested many years since by Dr. Joseph Parrish, of Philadelphia, in order to favor the closure of the minute vessels by the effused liquor sanguinis.¹

CHAPTER IV.

DUTIES OF A SURGEON IMMEDIATELY AFTER OPERATING.

AFTER accomplishing the object of his operation, and arresting the hemorrhage, the subsequent duties of the surgeon may be all placed under the general head of the Dressing.

¹ Elements of Surgery, by John Syng Dorsey, M. D., vol. ii. p. 350, Philadelphia, 1823.

SECTION I.

DRESSINGS.

The object to be attained in operating being very different in each case, it follows that the dressing must also be varied, and special directions may therefore be reserved until the consideration of each operation. Certain general remarks are, however, applicable to every operation requiring division of the skin; thus, attention should always be given to the means of cleansing the part, of favoring its cicatrization, and of preventing the recurrence of hemorrhage, in all which, although various opinions exist, yet certain general rules of practice are universally admitted. In this portion of the surgeon's duty, even good operators occasionally appear to be deficient, and show a degree of carelessness that is apparently due to the belief that the great object of the operation is attained when they lay aside their instruments. The education also of many of our students is very defective on this point, it being no uncommon event to see a class leave the operating room before the dressing is commenced, with as much indifference as they would show if this stage of the operation really had no value. Any surgeon, however, who has been long engaged in practice will, it is thought, sustain the assertion that the first and subsequent dressings of an operator are the real tests of his surgical skill. In making them, he first proves his claims to the high position of a surgeon, and rises above the grade of the "cutter." Before this he was limited to the mechanical portion of his profession, but in the dressing and after-treatment he has an opportunity of showing his judgment and the resources of his science. This subject should, therefore, receive the special attention of every surgeon or student.

Every dressing, after an operation, may be divided into two periods: 1st, the cleansing and uniting of the wound, and its protection from external or internal irritation; and 2d, the employment of such general means as will aid in its union.

§ 1.—*Closing of Parts after an Operation.*

The decision of the question of union by the first or second intention, having been in a great measure settled in the United States, by the almost universal practice of healing or attempting to heal every incision by the process of adhesion, the first dressing should generally be made with this object; an effort to close a part by granulation being an exception to the rule.

In attempting union by the first intention, the removal of all foreign matter is of great consequence, and may be effected either by squeezing a stream of water from a sponge upon the surface to be united, or by the direct application of the sponge itself. When the sponge employed in this, or other cases, is to be applied directly to the entrance of a wound, it is requisite that it should be as soft and free from sand as possible, and the selection of a proper article is, therefore, a measure of some importance.

Good sponge for surgical purposes should be of moderate size, conical shape, fine texture, open cells, and sufficiently elastic to expand readily in the hand after water has been expressed from it. The whiteness is a matter of little moment, unless the bleaching process has been carried so far as to destroy its texture, when the value of the sponge will be much impaired. As usually found in the shops, all sponges contain more or less of sand, coral, &c., the presence of which would prove highly detrimental to a tender surface, and should, therefore, be carefully removed by the surgeon or his assistants, some days before the sponge is to be employed. The best method of accomplishing this, and preparing sponge for surgical purposes, as tested by a long experience, is the following: Select a piece of sponge of the proper size, and pound it well whilst it is dry, so as to crush all the coral that may adhere to it. Then wash it thoroughly, pour off the water, place it in a porcelain vessel containing one part of muriatic acid to fourteen of water; let it soak two or more hours, or till all the sand is softened; then wash it in a solution of carbonate of soda—one ounce to the quart of water—and subsequently let it soak for an hour in running water, when it will be ready for use.

The mode of uniting a wound is generally as follows:—

To close a wound after an operation, resort may be had either to strips of adhesive plaster, about half an inch wide, and of a length

sufficient to obtain a good surface for adhesion ; to the application of collodion ; to sutures, or simply to bandages ; but in all cases of extensive wounds, before closing the skin by any of these means, it will be found useful to introduce a morsel of lint or linen between its edges, as suggested by Dr. Physick, in order to prevent union of the surface before the deeper parts have adhered, as this would tend to create an abscess. In employing strips of Adhesive Plaster, they should be first cut about a half inch wide, and of a proper length, and warmed by wrapping them around a bottle filled with *boiling* water, taking care to place the unspread side of the strip next to the bottle. After the plaster is thus softened, one end of the strip should be placed upon the integuments about one or more inches from the edge of the wound, and whilst the sides of the latter are approximated by the fingers and thumb of one hand, the strip may be stretched across it with the other so as to draw the two sides together. In this application, the strip should also be applied to the most depending portion first—a short interval being left between each piece, in order to favor the escape of any discharge from the wound. (Plate III., Fig. 13.) In using Collodion, strips of muslin, half an inch wide, should be moistened with it, and then applied in a similar manner, each being held upon the skin for a few minutes, or until it adheres. Though occasionally resorted to with satisfaction, as a substitute for adhesive plaster, I do not think collodion is likely to supplant the former article.

SUTURES or stitches are employed to unite such parts as, from their flaccid or movable condition, cannot be accurately held together by other means. For the formation of the suture various needles are employed (see Plate IV., Figs. 8, 9), any of which may be selected, according to the taste of the surgeon. The only matter of consequence in their selection is, to see that they have good points, keen sides, and sufficient temper to prevent their yielding to the force necessary for their introduction. Common saddlers' silk or linen thread is the article generally employed for the formation of the suture at the present day, though caoutchouc threads have been deemed preferable by Mr. Nunneley, of England, and leaden strands, employed in one form of the suture (perineal), by Dr. Mettauer, of Virginia. Platinum sutures, have also been praised by Mr. Morgan, of England. Under special circumstances, these modifications of the common thread may be useful ; but, in the majority of cases requiring the use of sutures, the old plan of closing

a wound by passing through its edges a keen needle armed with a good round thread, will answer quite as well. As caoutchouc, however, is readily softened by heat and pus, the loosening of the suture, when thus made, may be an object to the operator. Dr. Mettauer claims for the leaden suture the advantages likely to result from its being less liable to induce ulceration, in consequence of which it will hold its place a longer time.

The sutures now generally employed are the Interrupted, the Twisted or Hare-lip, and, occasionally, the Quilled. The Continued suture, and others recommended by the older surgeons, are now seldom resorted to.

THE INTERRUPTED SUTURE is formed of a series of separate stitches, and will be found of service whenever it is desirable to approximate large flaps, or those which present angles, as after crucial incisions and others of a similar character.

In making this suture, the operator should seize the side of the wound nearest to him, or its most depending portion, with the thumb and forefinger of his left hand, so that the latter will be on the inner side of the skin, and then introducing the needle, with its convexity downwards and its point directed upwards, pass it from without inwards through this flap, or side of the wound, and from within outwards through the other part, seizing the latter portion with the thumb below and the finger above the surface of the skin. Then, whilst the two sides are approximated by the fingers of an assistant, let the operator tie the ligature, if of thread or other soft substance, by a double knot, or if of lead, twist the ends by forceps, so as to place the knot on *either side of the line of union*, then cut off both ends of the ligature, close to the wound (Plate III., Fig. 12). When the knots of sutures are permitted to press directly upon the line of the wound, they are liable to induce such irritation as results in suppuration; whilst, if tied as directed, near either the point of exit or entrance of the needle, they may sometimes be removed without a sign of inflammation.

In making the points of a suture, the operator should remember not to pass the needle deeper than the integuments, if possible; to include enough tissue to sustain any strain that it may have to encounter; to avoid pricking nerves or tendons, and to place the first stitch in the middle of a longitudinal wound, the remainder being closed by as many points as may be requisite, intervals being left between each. In angular wounds, the first point of the suture

should be made at that part where all the free ends of the flap will come together, and subsequently elsewhere, according to circumstances. The interrupted suture, as well as all others, should be aided by the application of adhesive strips or uniting bandages, when there is any traction necessary in closing the wound, in order to diminish the strain upon the thread, and its tendency to create ulceration. In about three days, the stitches should be removed by seizing the knot with the dissecting forceps, elevating it slightly from the integuments, cutting the ligature beyond it, and then drawing the thread carefully out; but, in large deep wounds, or in parts of a loose and movable character, the union of the parts should be maintained for several days subsequent to the removal of the thread by the continued use of adhesive strips. If sutures are allowed to remain in a part longer than four days, except where they are passed so deeply as to include a large amount of tissue (as in the perineum), they will generally tend to prevent rather than favor union by adhesion, as they are apt to lead to suppuration or ulceration. A modification of the interrupted suture, suggested by Dr. Pancoast, of Philadelphia, and called the **PLASTIC SUTURE**, will be found in the account of the rhinoplastic operations, to which it is especially applicable. Dieffenbach has also recommended a **SUBCUTANEOUS SUTURE**, but it is only applicable to special cases, as *nævi*, &c., and will be noticed hereafter.

THE **TWISTED** or **HARE-LIP SUTURE** is especially applicable to operations in which there has been considerable loss of integument, and where the strain upon the simple thread would probably cause it to tear out of the tissue; or to cases where the parts are very movable, as in the lips, cheeks, &c. In its application, a straight pin or needle should be held between the thumb and right forefinger, and, commencing at the lowest or free edge of the wound, be passed as deeply through the tissue as is consistent with safety, on the right side from without in, and on the left from within outwards, the entrance and exit of the pin being favored by sustaining the parts with the thumb or forefinger of the left hand. Then, whilst the wound is well approximated by pressure from the fingers of an assistant, let the operator surround the pin with a thread, and, twisting it around the pin in the shape of the figure 8, tie the ends together over the line of the wound. After introducing as many other pins as may be necessary, their points should be removed (Plate IV., Fig. 10), or the surrounding parts protected from injury, either by a strip of

plaster, or by a pellet of wax on each end of the pin, and then the whole strengthened, if necessary, by adhesive strips.

Various opinions are entertained by operators as to the best material for the pins employed in this suture. Silver pins with movable steel points were, at one time, much used, and deemed especially suited to this mode of union; but large well silvered pins, or the straight steel needle advised by Heister, or pieces of wire, sharpened at the point, as recommended by Dr. Dorsey, of Philadelphia, or the insect-pins proposed by Dieffenbach, can be more readily obtained, answer quite as well, and, in my opinion, better than those with movable points. Where the solid pins are resorted to, their points should be cut off with the scissors or bone-nippers (Plate III., Fig. 9), in order to protect the soft tissues.

THE QUILLED SUTURE is, at present, seldom employed, being limited to those cases where it is desirable to unite very thick tissues, as in operations, lacerations, &c., of the perineum. In making this suture, several needles should be threaded by passing both ends of the thread through the eye of the needle, so as to form a loop on the middle of the ligature. Then, whilst the parts are held as directed in the interrupted suture, let the operator pass the first needle through the left side of the part from without inwards, as deeply as may be necessary, commencing at the middle of the wound, and bringing it out on the right side from within outwards. On removing this needle, let him next apply a small piece of waxed bougie, quill, or soft wood, on the left side of the wound, passing it through the loop; then, placing a similar piece between the free ends of the ligature on the right side, tie the ends of the thread loosely upon the quill; then, on placing two or more stitches at equal distances from the centre, draw them into firm knots upon the quills, and the parts will be thoroughly closed by the pressure thus made upon them. (Plate III., Fig. 11.)

Such modifications of these sutures as may be required in special operations will be referred to under the appropriate head, and especially in the account of the Plastic operations.

A peculiar mode of closing wounds by the application of a little serrated spring, termed by Vidal "*Serres-fines*," has been recently brought into notice by the French surgeons. The spring is sufficiently strong to hold the edges of a wound together, but the teeth, at the point of pressure, are apt to induce quite as much ulceration as that consequent on the use of the ordinary suture. As the

"serre-fine" can now be obtained from several of the principal cutlers in the United States, any description of it would here be unnecessary, and probably convey an erroneous idea of the instrument, unless accompanied by a drawing. I have occasionally employed them, but have not found any advantage from their use that could not be more readily obtained from other means which were of more easy access.

§ 2.—*After treatment as one of the means employed to favor Union.*

In the second portion of the duties of dressing, or the selection of such means as are requisite to facilitate the efforts of nature in healing the wound, lies the great skill of the operator. Unless the surgeon is well grounded in the principles of surgery, or unless he unites in himself the knowledge requisite for a good physician, he may now mar the whole proceeding, all his mechanical dexterity or anatomical knowledge proving of little avail if he is deficient in a knowledge of the great principles of inflammation. Now it is that judgment may be shown, even in apparently neglecting the case, or in "masterly inactivity," too much anxiety and officiousness preventing the success of an operation almost as certainly as want of skill. The constitutional treatment at this period is, therefore, often essential to success; the efforts of nature may require to be restrained or stimulated; rest or motion may prove useful or injurious; loss of blood, or purging, or a full or a low diet after a capital operation, may be the means of saving or destroying the patient; and nothing but a knowledge of the treatment of inflammation, together with the practical tact that experience alone can furnish, will enable an operator to conduct himself correctly in this most important portion of his duty.

In the third portion of the dressing, or that which has for its object the protection of the part from external agents, the subsequent steps will usually consist in the application of spread cerate, or of lint wet with cold water, or of compresses and bandages; but as this portion of the subject belongs to Minor Surgery, the reader is referred to the treatises on this subject for further details.

I cannot, however, omit calling attention at this time to the great superiority of the water-dressing over the older plan of cerate, &c. To make a water-dressing, it is only necessary to soak a pledget of patent lint in warm, tepid, or cold water (as most agreeable to the

patient), and lay it on the part, care being taken to moisten it freely from time to time, either by squeezing water upon it from a sponge, or by making a siphon of cotton-wick, and placing it in a neighboring vessel, so as to secure a more steady and equable supply, by capillary attraction. In the warm water-dressing it is also useful to lay a piece of oiled silk on the outside of the dressing, in order to prevent too rapid evaporation.

As connected with each dressing, the operator should next bear in mind the occurrence of secondary hemorrhage, the changes requisite in the articles employed as dressing, as well as the varied constitutional treatment rendered necessary by a change of action. Whenever, in any dressings, he desires to remove ligatures, let him seize the end of the thread between his thumb and forefinger, and make very slight traction upon it. If the ulceration of the vessel is completed, the ligature will readily separate by the least force, but if it is not, it should be left to nature. Occasionally, however, it happens that the ligature will remain attached to a vessel an unusual length of time, extending sometimes to fifty or seventy days, either in consequence of the employment of too large or too flat a thread, or from adhesions forming around its course, or from too much of the surrounding tissue having been included in the knot with the vessel. Under these, or other circumstances, when the operator is fully satisfied that time is being lost, he may resort to the expedient suggested by Dr. Physick, and twist the ligature slightly from day to day; or pass it over a compress placed at a short distance from the wound, and then fastening the free end to a sound part of the limb, by a portion of adhesive plaster, favor ulceration by the gentle strain thus exercised upon the ligature. If the tension thus exercised is moderate, it will enable the knot to separate from the artery by ulceration, but if it is sudden or violent, it will be liable to induce hemorrhage; judgment as to its employment is therefore necessary. In fastening the free end of the ligature, the position of the part to which it is attached and its motions should be noted; thus, if a ligature coming from the thigh should be thoughtlessly made fast to the leg whilst flexed, the patient, in extending the limb, would be likely to tear the thread off the vessel; so also in the arm and fore-arm. The point to which the ligature from an artery in either extremity is attached should, therefore, always be above the first joint.

PART II.

OPERATIONS ON THE HEAD AND FACE.

CHAPTER I.

SURGICAL ANATOMY OF THE HEAD.

THE head, as a Surgical Region, is divided into two parts: one, the Cranium, being all that portion of the bony structure which is occupied by the Brain; the other, the Face, being the region bounded above by the supercilia, and below by the base of the inferior maxilla. In the cavity of the cranium, anatomists recognize two distinct portions: one, the superior, which is designated as the Vault; the other, the inferior, and usually called the Base. With the Base of the cranium an operator has but little to do, it being so situated and connected with vital parts of the nervous system as to forbid the application of instruments to it, except in its lateral and inferior portion, where, in rare cases, it is necessary to perforate the mastoid cells in order to relieve deafness.

The Vault of the cranium is mainly important to the surgeon in consequence of the relations existing between the bones which compose it and the internal parts. The bones forming it are arranged so as to form a cavity which is accurately filled by the brain. Being of the class known as flat bones, they consist of two layers of compact matter with an intermediate diploë or reticulated structure, contain a large number of veins or sinuses, and are covered and nourished by an internal periosteum, or the outer lamina of the dura mater, as well as by an external membrane, known as the Pericranium.

The Dura Mater, or fibrous covering of the brain, is attached to the internal table of the bones of the skull, both by fibrous and vascular adhesions, and may be regarded as necessary to the nourish-

PLATE V.

INSTRUMENTS EMPLOYED IN TREPHINING AND OTHER OPERATIONS
UPON THE BONES.

Fig. 1. The Circular Saw of Martin, of Paris. 1. The handle. 2. The shaft. 3. The double joint. 4. The saw. This most useful instrument consists of a shaft to which circular or mushroom-shaped saws may be adapted by a screw. These saws may be made to revolve rapidly by means of the brace, Fig. 2. In consequence of the double joint at 3, the saw can be kept in motion no matter what may be the relative position of the shaft to which the brace is attached, except when the two are at a right angle. This saw is to be employed by the surgeon holding the handle, 1, whilst the assistant turns the brace, Fig. 2, when attached to the shaft at 2. I have used this saw in several instances, and found it an excellent instrument.

Charriere's Pattern.

Fig. 3. The Mushroom Saw, and Fig. 4, the Circular Saw, belonging to Fig. 1.

Charriere's Pattern.

Fig. 5. Hey's saw.

Schiveley's Pattern.

Fig. 6. Barton's Metacarpal Saw.

" "

Fig. 7. A fine flexible "Keyhole" Saw, for incising the bones of the face.

Schiveley's Pattern.

Fig. 8. The "Chain Saw," with the needle attached for carrying one end round a bone.

Charriere's Pattern.

Fig. 9. The Handles, to be attached to the saw after the needle is removed.

Charriere's Pattern.

Fig. 10. A Trephine of large size. 1. The crown. 2. The slide to raise the centre-pin.

Schiveley's Pattern.

Fig. 11. A smaller Trephine.

" "

Fig. 12. A short, stiff Brush to clean the teeth of the trephine.

Schiveley's Pattern.

Fig. 13. An Elevator for raising a depressed bone.

" "

Fig. 14. A Lenticular Knife, for the removal of spiculæ from the opening made by a trephine.

Schiveley's Pattern.

Fig. 15. A Scraper or Raspatory, useful in caries, &c.

" "

Fig. 16. A Steel Hammer, or Mallet.

Charriere's Pattern.

Fig. 17. A Steel Gouge, with the shaft passing through a wooden handle.

Charriere's Pattern.

Fig. 18. A Chisel of the same kind.

" "

Fig. 19. Liston's strong Bone Nippers.

Schiveley's Pattern.

Fig. 20. Strong Bone Forceps, for removing sequestra in necrosis.

Schiveley's Pattern.





ment of this table. In its duplicatures are found several large veins or sinuses, the principal of which, on its upper part, is the Superior Longitudinal Sinus (Plate VII., Fig. 1). This sinus runs from before backwards, in the median line of the cranium, and is liable to be injured if a trephine is applied in its course. Several arterial branches are also found on the vault of the cranium, outside the dura mater, and often more or less deeply imbedded in the inner table of the skull. Of these arteries, the most important to the surgeon is the meningea media, or middle artery of the dura mater, which is first noticed within the cranium, near the level of the external angular process of the os frontis, whence it ramifies in numerous anastomosing branches (Plate VII., Fig. 1). This vessel, like the longitudinal sinus, is also liable to be wounded in the operation of trephining, and, when opened, is sometimes ligated with difficulty, in consequence of its deep position in the bone. Cases, however, are recorded in which hemorrhage from it and from the superior longitudinal sinus has been arrested by pressure with lint.¹ The Pericranium, or proper periosteum of the cranial bones, adheres closely to their external surface, especially at the sutures, and by its vascular connections assists in preserving the vitality of the outer table of the skull.

Outside of the pericranium, upon the summit of the vault, is found the tendon, and at the front and back of the same region the bellies of the occipito-frontalis muscle, the fibres of which run nearly vertically, and the course of which should direct the line of all incisions in this region, a transverse cut being occasionally difficult to heal, from the retraction caused by the action of the muscle. The cellular tissue between the occipito-frontalis tendon and the pericranium is freely developed, and attaches these two parts so loosely together that the tendon and muscle move with great facility upon the pericranium. The cellular substance between the tendon and the integuments is, on the contrary, sparsely developed, uniting the two tissues very closely together. In this layer is found a small amount of fat, as well as the tegumentary bloodvessels and nerves; it is also the seat of most of the tumors found upon the scalp, the flattened and spheroidal shape of which is mainly due to the closeness of the structure, and its want of extensibility. This sparse cellular tissue is one cause of the great liability of the scalp to take on erysipela-

¹ See Trephining.

tous inflammation; and the rapidity with which the disease runs on to mortification is owing to the nutritive vessels of the integuments being compressed against the cranium, whenever effusions occur in its dense and unyielding structure. Its character will also be noticed in any attempt to place a ligature upon a divided vessel in the scalp, the difficulty of drawing out the vessel being due to the peculiarity just referred to. The skin immediately above this layer presents the hairs and other appearances known to every one.

In studying the structure of the scalp from the surface to the bones, we have, therefore, 1st, the skin with its hairs and follicles; 2d, a dense cellular structure closely adherent to surrounding parts, and containing the fat, together with most of the bloodvessels and nerves; 3d, the occipito-frontalis muscle and tendon; 4th, a loose cellular substance, permitting free motion of the muscle and tendon upon the parts beneath; and 5th, the pericranium closely adherent to all parts of the bones, but especially to the sutures. Wounds of the scalp are very apt to separate the integuments from the pericranium, in consequence of its loose adhesions; but, as the tegumentary vessels usually remain in the flap, it is generally only necessary to replace the latter in its proper position in order to enable the parts to heal. The density of the tissue, and the tendency of suppurations to travel in the cellular structure between the tendon of the occipito-frontalis and the pericranium, should always be borne in mind in injuries or operations on this region. Sutures employed to unite these parts should only pass to the tendon, and not beneath it.

The anatomical relations of the Face will be referred to hereafter.

CHAPTER II.

OPERATIONS UPON THE HEAD.

THE operations required for the relief of surgical affections of this region consist of those necessary in disorders of the soft parts, and those demanded by injuries and diseases of the bones or dura mater. In all these cases, the surgeon will find it a useful preliminary measure to shave the part freely, before commencing his ope-

ration, except in extirpating small encysted tumors, when the presence of the hair will be useful as a means of promoting the adhesion of the incisions, and when the union will generally be so prompt as to enable the patient to avoid the notice generally excited by a shorn scalp.

SECTION I.

OPERATIONS UPON THE SCALP.

Among the diseases of the integuments most frequently requiring surgical interference, are Encysted Tumors, and Nævi, or Vascular Tumors.

§ 1.—ENCYSTED TUMORS.

Encysted tumors are of various kinds, and, when found in the scalp, are usually situated in some portion of it exterior to the occipito-frontalis tendon, and are seldom covered with hair.

PATHOLOGY.—The variety called Atheromatous or Melicerous contain cheesy or more liquid matter, and are generally believed to be obstructed and enlarged sebaceous follicles, as suggested by Sir A. Cooper. They are most frequently placed immediately beneath the skin; consist of a perfect sac, having a smooth and shining surface internally, but rougher externally; and are, more or less, filled with cheesy or a similarly unorganized matter. Unless of long standing and of some size, these tumors do not adhere to the pericranium; but, when more fully developed, they sometimes induce such inflammatory action in this membrane as often results in adhesion, and, in some instances, in cartilaginous degeneration of that portion of the pericranium next to the sac. Occasionally, I have seen these tumors induce direct absorption of the outer table of the skull, so as to create a cup-like cavity, the edge of which was rough and slightly elevated. No bloodvessels enter these tumors, the organization of which is low.

ORDINARY OPERATION OF EXTIRPATION.—If the tumor is small, the surgeon should pass a sharp-pointed, narrow bistoury, with the back to the cranium, directly through its middle, and cut it open from within outwards. Then, after squeezing out its contents, let

him reflect the edge of the skin so as to retain it in one pair of forceps, whilst he seizes the divided edge of the sac in another pair, and draws it out from its cellular attachments. If the adhesions, however, are strong, careful dissection will be necessary to free the tumor from the pericranium, lest the latter membrane be injured and necrosis supervene.

In large encysted tumors, it will sometimes be found necessary to make an elliptical incision through the skin, so as to remove such portions of it as would prove superabundant; then puncturing the sac, proceed as before; but encysted tumors of a size requiring this mode of operating are rare, and any excess of skin will usually disappear soon after the removal of the sac, or cause no inconvenience to the patient. To attempt a dissection of the entire cyst is both tedious and useless.

DRESSING.—Cleanse the part thoroughly; see that no portion of the shining sac remains at the bottom of the wound, and tie or twist a few hairs together over the wound in order to close it, or, if the incision has been free, apply a compress and bandage. The hemorrhage seldom requires attention, or may be easily arrested by pressure. As these tumors are generally free from hair, shaving the scalp is unnecessary. The hemorrhage is also so slight as seldom to demand even a bandage.

§ 2.—ANEURISM BY ANASTOMOSIS, OR ERECTILE TUMORS.

PATHOLOGY.—A class of tumors formed chiefly by enlarged capillaries united together by cellular substance, and called by Mr. John Bell, Aneurism by Anastomosis, and by Graeffe, Telangiectasis (τελος, far; αγγειον, a vessel; εκτασις, dilatation)—are sometimes found on the scalp as well as in other portions of the body, and will be now referred to as a class, the operations for their cure being nearly the same wherever they may be developed. In most instances, these tumors only involve the integuments, and are supplied by one or two vessels which, entering near the centre of the structure, have no direct vascular connection with the skin of adjacent parts. Most frequently these aneurisms will be found of small size, though they occasionally attain the dimensions of a small orange. Being composed almost entirely of enlarged capillaries, the hemorrhage from them will be free when the diseased structure is incised,

though it is slight, and generally amenable to pressure, when the incisions are kept out of the new growth.

OPERATIONS.—When seated in the scalp, these tumors may be eradicated by various means of treatment, the object of all being to interrupt the supply of blood to the tumor, or to remove the tumor entire from the surrounding tissues.

In small tumors, the development of moderate inflammation in the diseased part will often suffice to produce an obliteration of its circulation, after which, the structure will either slough out or waste away; but in other instances, constriction of the tumor by ligatures or pressure may be required to accomplish the same object, though the most certain mode of cure will be found in extirpation. In all cases of anastomosing aneurism, it is important to operate at an early period, as their growth is often rapid, and the hemorrhage in proportion to their size, especially when the tumor is at all injured in the operation of extraction.

I. TREATMENT BY EXCITING INFLAMMATION.

Vaccination, as suggested by the Germans, may be performed by introducing the vaccine virus into the tumor, as in the usual operation for protection from smallpox. The resulting inflammation has, in some instances, been quite severe without resulting in a cure, and the practice is now seldom resorted to.

HEATED NEEDLES.—Dr. Bushe, of New York, induced obliteration of the vessels and sloughing of the diseased structure by introducing numerous needles (twenty or thirty), heated to a white heat, through different parts of the base of the tumor.¹ Dr. Valentine Mott and others have also employed this method with success.

OPERATION.—The needles being heated to a white heat in the flame of a spirit-lamp, and then passed immediately through the base of the tumor in various directions, should be quickly withdrawn, so as to cauterize the part and prevent any hemorrhage from the numerous punctures. The operation is said to be productive of but little pain, and to avoid the production of a scar.

CAUSTIC THREADS.—Dr. Nathan R. Smith, of Baltimore, has frequently cured the disease by the following operation: Soak a

¹ See Bibliography, p. 58.

PLATE VI.

OPERATIONS UPON THE SCALP AND SKULL.

Fig. 1. A front View of an Aneurism by Anastomosis on the forehead of a child, showing the combination of incision and strangulation as recommended by Liston. Four flaps formed by a erucial incision simply through the skin, have been turned off, and two needles, armed with double ligatures, have been passed at right angles to each other through the base of the tumor. The loop of each ligature being then cut, so as to form eight ends, two of them, 1 2, 3 4, 5 6, and 7 8, are to be tied firmly, so as to strangulate the tumor in four sections. After Liston.

Fig. 2. A Comminuted Fracture of the Cranium, showing a small fragment removed by the forceps, and the elevator as passed into the opening thus made, so as to elevate the depressed portion of the skull. When a fracture is thus comminuted, the employment of Hey's saw across an angle of the fracture, or the application of the forceps, will often enable the surgeon to make room for the entrance of the elevator without applying the trephine. Whenever the latter instrument can be dispensed with, the danger of injuring the dura mater is much diminished.

After Bourguery and Jacob.

Fig. 3. A View of the removal of a necrosed portion of the Parietal Bone, the integuments having been sufficiently dissected off from the head to permit the necrosed bone to be seized by the forceps and elevator.

After Bourguery and Jacob.

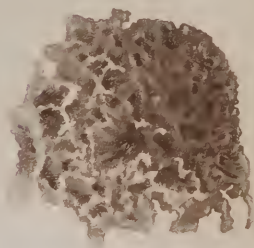
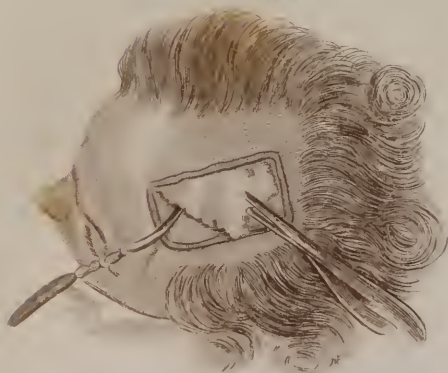
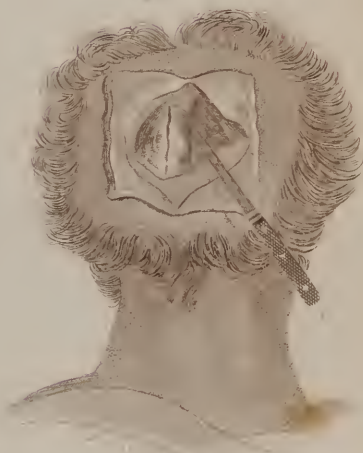
Fig. 4. Removal of a large tuberculated Exostosis from the posterior portion of the left parietal bone. The integuments have been everted by a erucial incision, and the tumor sawed through vertically. Hey's saw is seen in the act of removing it from the skull by cutting off its base.

After Bourguery and Jacob.

Fig. 5. A View of the Head of the patient operated on by Dr. Geo. McClellan, for a large spina ventosa of the eranium, showing the relative size of the incisions, and the depression left by its removal, as described in the text. After McClellan.

Fig. 6. The cancellated appearance of the tumor when removed.

After McClellan.





thread in a saturated solution of caustic potash, and, after drying it at a fire, pass it through a needle; transfix the base of the tumor, and, leaving the thread in position, remove the needle. Pass several in the same manner, and the tumor will soon waste away without causing any troublesome symptoms.¹

SETON.—Dr. A. H. Stevens, of New York, following the suggestion of Fawdington, of Manchester, of introducing a seton, has operated successfully by the following modification of his proceedings: A blunt-pointed needle, armed with several silk threads, being passed from one edge of the swelling, completely beneath it, to the other, the needle is withdrawn, and the silk thread left as a seton in the wound. No hemorrhage usually results, if the threads are sufficiently numerous to fill up the track of the needle; but supuration ensues—and, in one case reported by Dr. John Watson, of New York, a cure followed in which the cicatrix was only observable on minute examination.²

LIGATURES.—These means have been employed by Liston, Bell, White, Lawrence, and others, both in Europe and the United States, in various ways, so as to cut off the circulation from the base of the tumor by direct action upon its nutritious arteries; but, if applied so as to include the skin, they are liable to excite intense pain and violent inflammation of the surrounding parts, and in children, may even excite convulsions, or severe constitutional disturbance. To obviate these risks, it will be found advisable either to pass the threads around the base of the tumor by means of needles introduced immediately beneath the skin, as in the subcutaneous suture of Dieffenbach; or, when the latter is but slightly or not at all affected, to turn it back by a careful dissection, so as not to open the tumor; then passing two curved needles, armed with double ligatures, through the base of the tumor, cut off the loops of each thread and tie the eight ends together so as to strangulate it, and cause its removal by sloughing. (Plate VI., Fig. 1.)

Dr. J. RHEA BARTON, of Philadelphia, has operated successfully with the ligature, by passing two hare-lip pins at right angles to each other, through the base of the tumor, and then carrying a strong thread around them, and also across the top of the tumor, so as to strangulate all the portions included between the pins and

¹ American Journal of Medical Sciences, vol. vi. N. S. p. 260, 1843.

² See Bibliography, p. 58.

the ligature; the object of the pins being to confine the ligature about the attachment of the tumor, as well as to compress its structure upon them.

Dr. BRAINARD, of Chicago, has employed *Collodion* in small tumors, and reported cases of cure. As a simple remedy acting by constricting the vessels, it may be resorted to in cases of a limited character. It should be applied to the surface of the skin over the tumor by means of a brush.

II. OPERATION BY EXCISION.

A careful examination of many of these tumors having shown that they are not, in most instances, intimately connected with the surrounding parts, the practice of excision, as originally recommended by Mr. Bell, in England, and Dr. Physick, of Philadelphia, may be safely pursued when they are of moderate size, provided the incisions are kept in the healthy tissue. In their removal by excision, pass a needle and thick ligature through the tumor; tie its ends so as to form a loop, and facilitate its elevation from subjacent parts; then, making an elliptical incision around its base, dissect it out *without cutting into its structure*. In the scalp, the loss of integument and the hemorrhage will occasionally be an objection to this plan of treatment, especially if the tumor is large, and in these instances the following operation may be useful.

PARTIAL INCISIONS RENEWED AT INTERVALS.—In a case of congenital aneurism by anastomosis, which covered nearly the whole of the right side of the head, Dr. Wm. Gibson, of Philadelphia, commenced its removal by making an incision around one-third of the base, taking up all the bleeding vessels as they were divided, and interposing lint between the edges of the wound, so as to prevent the union of the integuments and the tumor at the point of incision; then, after an interval of a few days, he incised another third; secured the vessels; interposed lint in a similar manner, and, in a week afterwards, removed the tumor.¹

Dr. PHYSICK, in a similar case, cut round the tumor, tied up the vessels as they sprung, suffered the parts to remain with lint interposed to prevent immediate union, and the tumor soon afterwards

¹ Dorsey's Surgery, vol. ii. p. 272, 1823.

wasted away.¹ In a few instances, ligature of the carotid arteries has been resorted to, and the tumors subsequently excised.²

ANEURISMS OF THE SCALP.—Dilatation of the bloodvessels of the scalp and varicose enlargements, or large aneurisms by anastomosis, with other tumors, sometimes produce a condition of the vessels which, from its pulsation, resembles an aneurism, and which it is difficult to remedy by an operation, in consequence of the hemorrhage that ensues. In such cases, Dr. Benjamin Dudley, of Kentucky, has recommended compression by means of the common roller and properly adjusted compresses, and has succeeded in speedily curing cases of this kind in which the disease occupied one-half of one side of the head and forehead, and involved all the upper eyelid with the inner and outer canthus of the eye.

REMARKS ON THE VALUE OF THESE METHODS OF OPERATING.—In cases where the skin is not much involved in the disease, or where the tumor is not larger than a walnut, or where the cicatrix would not create much deformity, excision will, I think, be found preferable to the other operations, the hemorrhage being in most instances, according to my experience, readily controlled by ligature or by pressure, particularly when care is taken to incise only the healthy structure, and not to open the tumor; and there are few surgeons who have tried excision that have not preferred it to other means, especially when they had proper assistants.

Dr. WARREN, of Boston, has long favored this operation, especially when the tumor was seated near the eyes, nose, mouth, or other natural apertures.³ In his practice, three cases were treated by caustic applied externally so as to cause a slough, eight by ligature, and eighty-five by excision, all successfully.⁴

Where the tumor is very vascular and large, or so situated as to create deformity by the cicatrix, the seton, as employed by Drs. Stevens and Watson, will be found to answer a good purpose, or cauterization by the heated needles may effect a cure, especially if the needles be made large. Vaccination is hardly worth the trial, unless in the hands of a timid practitioner. If the large size of the tumor should create just apprehensions of the hemorrhage likely to result from its prompt extirpation, the repeated operations of Drs.

¹ Dorsey, *loc. cit.*

² See Bibliography, p. 59.

³ Warren on Tumors, p. 461.

⁴ Cooper's Surg. Dict.—Appendix by Reese, of New York, article *Nævus*.

Physick and Gibson will, it is thought, answer better than the ligature of the carotids. In the cases reported by Drs. Mussey and Warren, the cure of large vascular tumors on the scalp did not ensue upon the ligature of the main arteries of the neck.¹

§ 3.—CEPHALÆMATOMA.

Cephalæmatoma (κεφαλή, head; αἷμα, blood), or the bloody tumors occasionally found on the heads of very young infants, may perhaps require the attention of the surgeon. These tumors have been divided by Valleix² into those in which the sanguineous collection is subaponeurotic, subpericranial, or submeningeal. These tumors differ in position, from the bloody infiltration of the scalp, which is the result of a tedious labor, as this is most frequently seen near the vertex; whereas the common position of cephalæmatoma is the line near, but not at, the junction of the angle of the right parietal bone with its fellow. The subpericranial cephalæmatoma is the most common form, and demands prompt attention in order to prevent such a separation of the pericranium from the bone as may result in caries or necrosis. These tumors are said, by Nelaton,³ to be most frequently seen immediately after birth in first children. Generally, nothing more is necessary for their cure than time and cold applications; but when the effusion is large, and likely to elevate the periosteum to any extent, it may become necessary to evacuate it in order to save the bone. Under these circumstances, a puncture which is merely sufficient to give exit to the blood, without admitting the entrance of air beneath the scalp, is all that is requisite. The reader who is desirous of more detailed information on the pathology of these tumors will be repaid by perusing the paper of Dr. Geddings, of Charleston, in the *North American Archives*, vol. ii. p. 217.⁴

§ 4.—DIVISION OF THE SUPRA-ORBITAR NERVE.

In some cases of injury of the forehead, and especially in contused wounds, the supra-orbital nerve has become involved in the

¹ See Bibliography, pp. 92, 93.

² *Maladies des Enfants.*

³ *Pathol. Chirurgical.*

⁴ See Bibliography, p. 59.

cicatrix, or given rise to such a neuromatous tumor as rendered the division of its trunk necessary, in order to relieve the neuralgic pain resulting from the condition referred to. In such cases, the object may be easily accomplished by a subcutaneous section.

OPERATION.—In order to secure the division of the main trunk of the nerve, which is often superficial at its exit from the supra-orbital foramen, the surgeon should introduce a sharp-pointed and narrow bistoury flatwise beneath the integuments, and close to the bone, on the external or temporal side of the foramen, passing it a few lines towards its inner side. Then, turning its edge towards the integuments and its back to the bone, let him divide all the tissues from behind forwards until sensation is destroyed, taking care not to cut through the skin; then turning the bistoury again flatwise, withdraw it at the point of entrance, closing the orifice immediately with adhesive plaster. Should a return of the disease lead to the suspicion of reunion in the nerve, a dissection and excision of a portion of its trunk may become necessary. Among the most decided cases of relief afforded by this operation, are those reported by Dr. John C. Warren, of Boston.¹ Dr. Warren² informs me that he has divided the three branches of the fifth pair many times with success. He has also operated on other nerves, in cases of severe neuralgia, especially in connection with those of the jaws and extremities, such as the infra-orbital, sub-maxillary, and portio dura, all of which have been divided by him with marked relief to the neuralgic disorders of their branches.³

§ 5.—TUMORS OF THE SCALP.

The scalp, like other portions of the integuments of the body, may become the seat of tumors—such as mollusca, encephaloid, fibrous, encysted, &c.—though they are by no means common in this position. When they exist, the propriety of their removal should be decided by the prevalence at the time of erysipelas as an epidemic, the fact of the scalp being exceedingly prone to erysipelas, rendering the risks of an operation greater in this region than elsewhere.

¹ Boston Med. and Surg. Journal for 1825. Also Bibliography, p. 66.

² Dr. Warren in MS.


³ Bibliography, p. 66.

§ 6.—VENOUS TUMORS OF THE SCALP.

The Veins of the scalp sometimes become enlarged, and present a varicose condition, which Mr. Fergusson, of England, has recommended should be treated by means of needles and pressure from ligatures, in the manner referred to in the treatment of varices of the leg. This condition of the veins of the scalp, independent of other complaints, must, however, be very rare, as I have never seen an instance of it during my attendance either in the United States or in the Parisian hospitals.

SECTION II.

OPERATIONS UPON THE BONES OF THE CRANIUM.

The operations practised on the bones of the cranium, are those required by diseases or injuries of one or both tables of the skull, such, for instance, as caries, necrosis, exostosis, fracture, or for the evacuation of bloody or serous effusions from within the cavity of the cranium. In the diagnosis or treatment of any of these affections, the operator will find it advantageous to shave the scalp at the point to be examined or operated on, so as to render the sensation given by the scalp less deceptive to the touch, as well as prevent the adhesion of the discharge and dressings to the hair. He should also have at hand one or more of the instruments referred to, and shown in Plate V. In many cases, and especially when there is no wound at the part, he will find it necessary to incise the scalp; the incisions required under such circumstances being either in the form of an +, L, V, or , and so arranged that the angles, by their dependent position, may favor the escape of subsequent collections of pus.

§ 1.—OPERATIONS FOR CARIES AND NECROSIS OF THE CRANIUM.

In operating upon the skull for either caries or necrosis, the bone should be sufficiently, but not too freely, exposed, by dissecting back the scalp to the necessary extent, and the same precepts be observed that are applicable to these diseases in the bones of the extremities, to wit, care taken not to disturb the pericranium or membrane covering the bone. After this, all the softened or

dead structure should be carefully removed, by means of the raspatory, saw, trephine, elevator, or forceps (Plate V., Figs. 14, 15), until the surrounding bone shows by its color and vascularity that it is capable of taking on healthy action.

In operating for the removal from the cranium of an exostosis, osteo-sarcoma, spina ventosa, or any bony tumor, the incision should be so made through the integuments, as freely to expose its base, and enable the operator to separate it from the skull with the saw, either by cutting through its centre down to its base (Plate VI., Fig. 4), or by exposing the base and then sawing through it on a line with the general convexity of the head.

A remarkable case of spina ventosa of the cranium having been presented to the late Dr. Geo. McClellan, of Philadelphia, the following operation was practised for its removal. The tumor (spina ventosa) was 4 inches in length, $3\frac{1}{2}$ inches in its short diameter, and about $1\frac{3}{4}$ inch above the surrounding portion of the skull:—

OPERATION OF DR. GEORGE MCCLELLAN, OF PHILADELPHIA.—The patient was a man twenty-two years of age, and had suffered from various symptoms connected with the head for three years; it was therefore decided to operate upon the tumor as follows: Two long incisions being made at right angles, and near the centre of the swelling, the scalp was dissected up from the whole surface, and to some extent around the sound bone. Then, with a long, narrow saw, held at a tangent to the circumference of the cranium, the entire tumor was cut off at its base. The appearance of the cells of the tumor, and of the scalp subsequent to its removal, is shown in Plate VI., Figs. 6 and 5. Owing to the character of the tumor as thus shown, it was deemed necessary to remove the whole mass from the surface of the dura mater beneath it, which rendered the operation much more tedious and difficult, but which was accomplished by circumscribing the whole mass of the tumor by the circular edge of Hey's saw, and then prying it out in successive fragments, by means of an elevator, which was occasionally aided by the bone-nipper and forceps.¹ The dura mater, when exposed, had been so much depressed by the external development of the tumor, as to present a deep cavity, capable of holding four ounces and a half. In removing some spicula of bone, this membrane was wounded, but the hemorrhage was arrested by pressure.

¹ McClellan's Principles and Practice of Surgery, p. 340.

Very little irritation ensued on the operation. In nine days, the compresses were loosened by suppuration, and, on removing them, the whole surface was found to be granulating, and an orifice which had been made in the longitudinal sinus was closed. The patient subsequently recovered, and his case, owing to the change in his mental disposition, attracted considerable attention from Mr. Combe and other phrenologists.

§ 2.—TREPHINING THE CRANIUM.

As the brain fills accurately the cavity formed by the bones of the head, any cause which diminishes the space naturally occupied by this organ, generally impairs its functions, and leads to a train of symptoms which may terminate life. To obviate these, and relieve the cerebrum from pressure, the operation of perforating the skull, so as either to restore its natural convexity, or give exit to effusions within it, was suggested, and has been practised since the times of Hippocrates, B.C. 460, the skull being perforated either by the Trepan or by the Trephine, and the operation named after the instrument which was employed to accomplish it, as Trepanning or Trephining.

The Trephine is a circular saw, which is made to perforate the skull by frequently turning the hand from pronation to supination, the division of the bone by its application constituting the operation of Trephining. The French surgeons of the present day, like those of the time of Hippocrates,¹ employ a somewhat similar saw, though it is one which, like the antique instrument, is fitted to a brace, and worked like a brace and bit. This instrument retains the old name of Trepan (*τρῑπανον*, I perforate), and the operation is hence called Trepanning. The trephine differs from the trepan not so much in the shape of the saw, as in its being made to act by moving in a continuous circular course, rather than in alternate semicircles, as is the case with the trepan. The sawing portion of the trephine is named the *crown*, in the middle of which is the *centre-pin*, or point to steady the saw in its first movements. This instrument is the one employed in the United States, whenever it is necessary to perforate the cranium, but is much less resorted to at the present period than it was formerly, many of the older surgeons having deemed it right to employ it in every possible affection of the skull, whether accom-

¹ Hippocrates on Wounds of the Head, translated by Riollay, London, 1783.

panied by depression or not. As the trephine merely cuts an opening in the skull, the other instruments hereafter named will occasionally be required to elevate the bone or remove the detached portion.

When, from a depressed fracture or effusion of blood outside the dura mater, the brain is compressed, and the surgeon is satisfied that the removal of the compression will probably enable the brain to recover its functions, he should prepare for the operation as hereafter directed.

But as the propriety of trephining is often a point which it is difficult to settle, I would offer the following synopsis of the symptoms which usually justify the operation:—

1st. It is generally proper to trephine the head, when the evidences of compression are present, and the depressed bone can be distinctly felt or seen through a wound in the scalp.

2d. When, though not seen, the depressed portion is positively felt through the scalp, the hair having been previously shorn, and every precaution taken to avoid deception either from the oedematous scalp, from effusion beneath the pericranium, or from the presence of the sutures or other conformations peculiar to the patient, as may be recognized by comparing the two sides of the head.

3d. When, though no depressed fracture can be detected, the patient has shown sudden signs of compression after a blow likely to create either a fracture or laceration of the bloodvessels.—The propriety of trephining, under any circumstances, is however a question on which surgeons have long differed, some, trephining in every case of unconsciousness, and others limiting the operation to cases of marked compression. Without, then, presuming to suppose that any individual opinion can settle this vexed question, I would advance the expression of my own experience as being favorable to the performance of the operation in all cases of compression due to a depressed fracture, as well as to cases of epilepsy consequent on such injuries.

Further remarks on this subject will be found at the close of the description of the operation.

PREPARATION FOR THE OPERATION.—1st. Shave the patient's head and arrange the instruments upon a board or tray in the order in which they are designated, or in that in which the operator thinks they may be required. 2d. Place the patient so that the head may be readily acted on without the operator stooping too much; take care also that the bed or table is not too high, as

this may likewise create difficulty, and fatigue the surgeon in the manipulation of his instruments.

I. INSTRUMENTS THAT MAY BE REQUIRED FOR THE OPERATION OF TREPHINING.¹

1. One large scalpel, to incise the scalp. 2. A pair of dissecting forceps, to raise the flap. 3. A tenaculum or forceps, to seize the arteries in the scalp. 4. Ligatures and needles. 5. One large and one smaller trephine to perforate the skull, with a brush to clean the teeth of the saw, and a probe or toothpick to test the depth of the furrow. 6. A pair of forceps, to remove the disk of bone. 7. A lenticular, to remove splinters in the opening. 8. An elevator. 9. A sharp-pointed bistoury or lancet, to puncture the dura mater, when compelled to do so by extensive effusion beneath it. 10. Hey's saw, to divide loose or angular portions of the cranium if a perforation already exists. 11. Sponges and articles of dressing.

ORDINARY OPERATION.—If the scalp is uninjured, and an incision is required in order to expose the bone, it should be made by dividing the scalp either in a crescentic form, as advised by Pott and Velpeau, or in that which is V-shaped, or crucial +, as recommended by Dr. Physick, so that the part upon which it is proposed to operate, may be left bare, the flaps being dissected free from the pericranium, but the latter disturbed as little as possible. Should a wound already exist, it may be enlarged to the necessary extent without forming an incision of the shape above described. Having thus exposed the bone, the trephine should be taken in the right hand, with the centre pin projecting, and held as seen (Plate VII., Fig. 3), so that the crown can be applied either upon the edge of the depressed bone, or sufficiently near to permit its being raised by the elevator, when inserted through the opening cut by the trephine. Then, turning the hand steadily and slowly from pronation to supination, and pressing firmly upon the handle so as to cause the saw to cut itself a track in the outer table, make a few turns; remove the instrument, draw up or take out the centre pin—test the depth of the track of the saw with a toothpick, and, reapplying the instrument, renew the sawing until the diploë is reached. This struc-

¹ See Plate V.

ture, if present, may often be recognized by the bloody character of the sawdust, or by the more free action of the saw, though the absence of either is no sign that the trephine has not entered the diploic structure of the skull, as it is but often sparsely developed. After testing again the depth of the track, saw cautiously, examining the state of the furrow from time to time, until the skull is perforated, or nearly so, the latter being told by gently acting in the furrow with the forceps or lever, and endeavoring to raise the piece. When the disk is found to be sufficiently free, it may be either pried out with the elevator or removed with the forceps, or it may come away in the crown of the trephine without any special effort being made for its removal. On removing the piece, the dura mater will be seen perfectly exposed, and if the case is a depressed fracture, the operator should introduce the elevator very cautiously between this membrane and the cranium, and keeping the point of the instrument close to the latter, use the thumb, or the sound part of the adjoining bone as a fulcrum, so as to elevate the fractured portion to its proper level, taking care to mould it to its former convexity by pressing with the fingers upon the outside of the skull. If, on perforating the bones, blood is found to be effused outside of the dura mater, careful manipulation will enable the operator to turn it out without injuring the membrane, as this is generally depressed and separated from the inner table of the skull by the effusion. If, however, the blood is evidently beneath the membrane, it may be questionable whether the danger from its puncture is not greater than that which would ensue if the effusion were left to nature. The judgment of the surgeon, based upon the urgent character of the symptoms, can alone decide this point. Patients have recovered when the membrane has been punctured and even considerably lacerated, yet no judicious operator would deem such a result a precedent, except in cases of great emergency.

If, in the application of the trephine, any of the bloodvessels of the dura mater are accidentally cut, the bleeding may be checked by pressure, or by ligature, as was done by Dr. Dorsey, of Philadelphia, in a case in which hemorrhage from a wound in the superior longitudinal sinus was so free as to demand the application of a dossil of lint, or by applying a ligature to the wounded vessel, as was done in a wound of the middle artery of the dura mater, by Dr. F. Dorsey, of Maryland.¹

¹ Dorsey's Surgery, by Randolph, vol. i. p. 323, 1823.

PLATE VII.

A VIEW OF THE STRUCTURE OF THE HEAD AND OF THE OPERATION OF TREPHINING.

Fig. 1. A side View of a lateral section of the head, showing the relations of the scalp, skull, and brain, with its bloodvessels. 1. The scalp, after the hair has been shorn. 2. The tendon of the occipito-frontalis muscle. 3. The divided edge of the bone, showing the outer and inner tables, and the diploë structure. 4. The shining surface of the dura mater. 5, 5, 5. The superior longitudinal sinus, extending from the crista galli to the Torcular Herophili. 6. The middle artery of the dura mater, where it first passes on to the vault of the cranium. 7. Its anterior branch. 8. Its posterior branch. 9, 9. The lateral sinus of the dura mater in its course along the occipital and temporal bones to empty into the internal jugular vein.

After Bernard and Huette.

Fig. 2. A View of a stellated and depressed Fracture of the Cranium, showing the point at which the perforation of a trephine should be made, so as to elevate the depressed portion. 1. Point of perforation of the trephine. 2. The depressed portion of the skull.

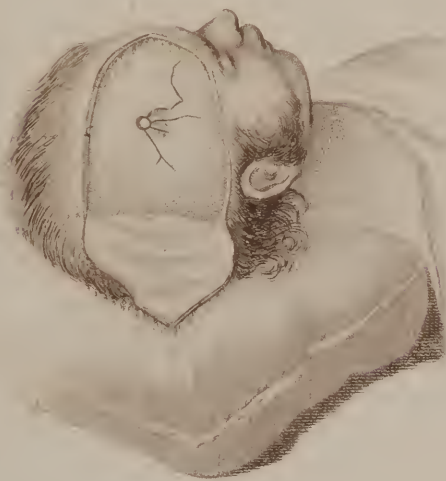
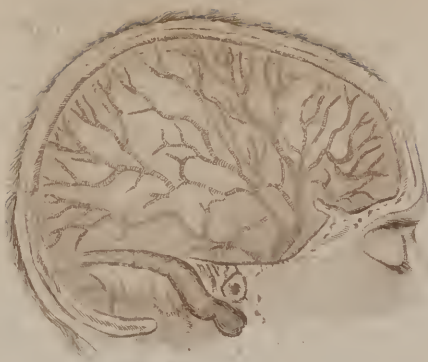
After Bell.

Fig. 3. A lateral View of the operation of Trephining, as practised on the right parietal bone. The patient is represented as comatose from a depressed fracture, and lies with his head firmly supported and steadied on a hard pillow placed well under the neck. The integuments over the depressed portion have been incised, and dissected back sufficiently far to expose the fracture, whilst the surgeon, holding the handle of the trephine firmly against his palm, and with the forefinger extended upon its shaft, is just commencing to pronate and supinate his hand, so as to work the crown of the instrument, and cause it to excise a portion of the skull sufficient for the introduction of the elevator, or the evacuation of the clot.

Drawn from Nature.

Fig. 4. A View of the position of the Lenticular Knife, as employed in removing any spicula left on the internal table of the skull after the use of the trephine. 1. Position of the hand in using the lenticular.

After Bernard and Huette.



Hemorrhage from the same artery, which was deeply imbedded in its channel in the bone, has also been arrested by Dr. Mütter, by plugging the vessel in its bony canal with a small piece of soft wood, as recommended by Dr. Physick. Bleeding from the integuments may be readily checked by a needle and ligature, or by the latter applied in the usual manner, with the tenaculum.

DRESSING.—After the perforation has been completed, the parts should be cleansed; the flap loosely applied over the opening, covered by a poultice, and the case treated as a suppurating wound until the skin has healed; care being taken to secure the free exit of pus from beneath the integuments, and attention given to any signs of meningeal inflammation. In all cases, the strictest diet should be rigidly observed until all risks of inflammation have passed away. After recovery, the head may be protected, if the individual is exposed to injury, by using a thick-crowned hat for several months, or until ligamentous matter closes the perforation in the bone.

REMARKS.—The propriety or impropriety of trephining, in cases of injury or other disorders of the head, is, as has been previously stated, a question which at all times has had able advocates on both sides. That the application of the trephine was at one period unnecessarily resorted to, cannot be doubted with our knowledge of the structure of the cranium, and its relations to the brain, especially as we find it to have been employed in cases of concussion of the brain under the idea that blood was effused at particular points of the head, merely because the bone was discolored or seemed too vascular. Though the result of such practice has been to throw doubt upon the utility of the operation, there can be no question that evil has also ensued from the opposite extreme, patients having been permitted to die when the application of the trephine might have saved them. Judgment is therefore necessary in order to prevent the misapplication of this, as of many other useful remedies. In some instances, the relief afforded by the application of the trephine has been very prompt, and in a case reported by Dr. Quintard, of Georgia, the elevation of the depressed bone gave instantaneous relief from insensibility, loss of power, &c. Dr. Dudley,¹ of Kentucky, has also reported numerous cases of prompt relief from epileptic symptoms which followed the removal

¹ Transact. of Med. Society of Georgia. Report of Committee on Surgery.

of a spicula, or of a depressed bone, and Dr. Holston, of Ohio, has also reported numerous similar cases.¹ Dr. John Harden, of Louisville, is so well satisfied of the advantages of trephining in most cases that he proposes, at the close of an account of numerous cases,² the following rule: "That in every clearly ascertained fracture of the cranium with depression, the bones should be elevated or removed whether there be a scalp wound or not." There are, however, many surgeons who entertain a different opinion. To furnish additional aid in cases where the experience of the operator may be limited, the following statistics, collected with care, are presented; and though not perhaps sufficiently numerous to settle definitely the propriety of the operation, they will yet tend to show how the result may vary in different cases, though statistics which do not state the circumstances of each case cannot be positively relied on in the formation of an opinion as to the advantages or disadvantages of any operation.

STATISTICS.—The following table shows the number of cases trephined and of those not trephined, with the comparative results of each plan of treatment, although nothing is said of the peculiarities of either set of cases, a fact which must always aid in the decision of the operation.

Cases.	Trephined.	Cured.	Died.	
77	51	11	40	Laurie and King.
Not stated	42	28	14	H. H. Smith.
Not stated	45	11	34	Dr. Lente, N. Y.
	<hr/> 138	<hr/> 50	<hr/> 88	

Cases.	Not Trephined.	Recovered.	Died.	
77	26	18	8	Laurie and King.

Whether the latter injuries were more serious than those in the former cases, is not stated.

Dr. Lente,³ of New York, who has furnished a most elaborate account of 128 cases of severe fractures as presented in the New York Hospital, and a portion of which is included in the above numbers, has arrived at the following results:—

¹ Bibliography, p. 62.

² Western Journ. of Med. and Surg., vol. ix. p. 203, 1852.

³ New York Journ. Med., vol. viii. p. 29.

Out of 128 cases of fracture of the skull, 106 died. This extraordinary mortality Dr. Lente regards as due to the violent character of the accidents which caused the fracture, yet we notice that, in 45 of these bad cases, about one-fourth of those trephined recovered; and that out of the 22 recoveries, one-half were trephined successfully. The operation was performed *prophylactically*, in ten of which three were cured, and, *therapeutically*, in 32 of which eight were cured.

In 26 or 20.31 per cent. of all his cases, both the brain and its membranes were lacerated. In ten, there was hernia cerebri, of which only two recovered. In twelve cases, where the symptoms of compression were well marked, the patients not being in immediate danger of death, the pupils were *dilated* in ten, contracted in *two*.

In five cases of those trephined, an incision was made in the dura mater—none of these recovered.

Although these statistics are far from perfect, yet they tend to show that in fractures of the skull attended with symptoms of compression, the operation of trephining affords a better chance of recovery than leaving the case without an operation.

In epilepsy, trephining has been much more successful, and the performance of the operation in well-marked cases has been followed by the happiest results. Of fourteen cases that I have collected of the operation in this complaint, all were reported cured but one.

It may, therefore, be assumed as a general rule by the inexperienced surgeon, that trephining, or the removal of depressed portions of bone by any of the instruments in the trephining case, will be advantageous under the following circumstances:—

1st. In bad compound fractures, where the depression can be seen and the symptoms of compression are well marked.

2d. In simple fractures, where the depression is positively felt, and similar symptoms exist.

3d. In bad compound fissures of the cranium, accompanied by free hemorrhage from within the skull and attended with symptoms of compression.

But the necessity of puncturing the dura mater in any case, should always induce an unfavorable prognosis, or a very guarded one.

In every case that it is proposed to operate on, the surgeon should distinctly explain to the patient's friends the serious character of the accident, and the fatal tendency of the case, whether operated on, or left to nature.

II. TREPHINING THE FRONTAL SINUS.

OPERATION.—In the rare cases in which it may be deemed necessary to apply a trephine upon the frontal sinus, the operator should proceed precisely as in the application of the instrument upon the vault of the cranium, recollecting, however, that an opening in the outer table of the skull, which at this point is often quite thin, is all that is necessary.

§ 3.—PUNCTURING THE HEAD FOR HYDROCEPHALUS.

An effusion of serum within the ventricles of the brain, or in its membranes, being usually the result of serious organic disease, but little benefit can be anticipated from an operation which simply looks to the removal of the effect, instead of the cause of the difficulty. When, however, medical treatment has failed, tapping the head for the removal of the fluid may be deemed worthy of trial, as a last resort, and with a view of prolonging life, although the *post-mortem* examinations in most instances have shown that the cerebral structure was so much diseased, as to leave but little reason to anticipate the general adoption of this operation. In the United States, it has been performed by Dr. Physiek,¹ by Dr. Glover, of Charleston,² by Dr. L. A. Dugas, of Georgia, and Dr. J. B. Whitridge, of South Carolina, and many others.³ Dr. Dugas tapped his patient seven times, and drew off sixty-three ounces of liquid, the patient living from June 25th to October 18th. When the effect of the heat of summer upon children is recollected, it will doubtless be admitted that life was prolonged in this case beyond what might have been anticipated. In the case of Dr. Whitridge, the child lived from August 31st to October 31st ensuing. Accounts of cures effected by tapping, are also reported as performed by Dr. James Vose, of Liverpool, in the *Medico-Chirurgical Transactions*, vol. ix.; by Dr. Conquest, of England, in the *Lond. Med. Gazette*, March, 1838; by Dr. West, in the same journal, April, 1842; as well as in the *Bulletin Gén. de Thérapeutiques*, vol. xxiii.; though I have not been able to examine the latter paper. In one case reported by Dr. Conquest,

¹ Philadelphia Medical Journal, vol. iv. p. 316.

² *Ibid.*, p. 403.

³ Am. Journ. Med. Sciences, vol. xx. p. 536, 1837.

the number of operations performed on it was five, at intervals of from two to six weeks, and the total amount withdrawn was about fifty-eight ounces. Dr. Conquest also appears to have had marked success in his operations, having ten patients to live out of nineteen operated on.¹ Of sixty-three cases, carefully collected from different authors, and reported by Dr. West, of England,² not more than two out of seven recovered; six dying within four days, and only one surviving six months. The general success of the operation is therefore far from justifying its repetition.

ORDINARY OPERATION.—Introduce a needle and canula, or a fine trocar, as advised by Dr. Conquest, at the coronal sinus, midway between the crista galli and the anterior fontanel, or at any point of the fontanel or other opening in the head, not likely to interfere with the corpus striatum or the sinuses, and carry it deep enough to reach the cavity containing the fluid, as may be told by the want of resistance at the point of the instrument. This will most frequently be found to be before the trocar has penetrated two inches. Then, after allowing the fluid to escape through the canula slowly and cautiously, make moderate compression upon the cranium either by the turns of a roller, or by strips of adhesive plaster tightly applied, as advised by Sir Gilbert Blane and others.—It may, I think, be doubted whether, as a general rule, there is any advantage in compressing the skull from the commencement of the operation, as has been sometimes done, as the distended condition of the brain will generally suffice to force out the liquid with sufficient rapidity, while the gradual evacuation, by enabling the skull to adapt itself to the diminished size of its contents, will obviate the evils sometimes seen if compression is not accurately preserved. Various obstacles may present themselves during this operation, such as the sudden arrest of the flow of the serum from a small particle clogging the canula, or the hemorrhage of a vein, or faintness, or convulsions, for all which the surgeon should be prepared; thus the introduction of a probe will soon clear the canula, a little time check the hemorrhage, faintness be obviated by lowering the head and applying ammonia to the nostrils, and the convulsions often cease when the escape of the fluid is checked by placing the finger over the canula. If, however, the operation is conducted as advised by Dr. Physick, without compressing the head—that is, by allowing the

¹ London Medical Gazette, March, 1838.

² *Ibid.*, vol. ii. April, 1842.

fluid to escape slowly through a small canula, and simply by the contraction of the natural tissues, until it ceases to flow freely—the pressure from the fluid within the brain will be so gradually removed that the application of moderate external pressure will more than compensate for its disappearance. In all cases when a bandage is applied to a cavity containing liquid at the moment of its being punctured, the pressure, according to the views of Dr. Physick, evacuates the fluid so rapidly as to create a marked change in the relation of the parts, which is not the case when the escape of the fluid is due solely to vital contractility, and in the case of a brain which has been much distended, may be quite sufficient to destroy its action. Compression of the head during the operation has, however, been strongly urged by Dr. Conquest, and his success has certainly been very marked. After a sufficient amount of the liquid has been evacuated (as indicated by the pulse), the puncture should be closed, the bandage applied and kept accurately adjusted, and a proper medical treatment, especially of mercurials, persevered in.

As the subject of Paracentesis capitis has lately excited some attention, I cite the following case, as reported by Dr. William Pepper, of Philadelphia, as an additional illustration of the character of these operations:—

OPERATION OF DR. ED. PEACE, OF PHILADELPHIA, FOR PARACENTESIS CAPITIS.—Disease of the head having apparently commenced soon (three days) after birth in the child of a healthy woman, and the senses being nearly destroyed, it was determined, as the child was now seventeen months old, and must certainly sink under the continued progress of the disorder, to attempt its relief by paracentesis capitis, which was done as follows:—

OPERATION.—A small silver canula, armed with a grooved trocar, being introduced about one inch to the right of the longitudinal sinus, and half an inch from the superior margin of the os frontis, the trocar was removed and followed by a jet of limpid serum, which continued to flow until about twenty ounces were evacuated, moderate pressure being maintained upon the head during the operation by the hands of assistants. After the evacuation of this amount and the removal of the canula, a pledget of dry lint was applied to the puncture, and lightly secured by a strip of adhesive plaster; after which the whole head was permanently compressed by broad strips of plaster, so applied as to envelop it completely. Soon

after the operation, the pulse was good, and the child took the breast with avidity, no untoward symptom supervening until the fourth day after the operation, when it became more restless, with increased heat of head, &c., and died on the sixth day. A considerable amount of serum continued to flow from the puncture throughout this period of six days. A *post-mortem* examination showed that the hemispheres of the brain had been distended into mere sacs, and that the ventricles still contained about four pints of turbid serum. The whole amount effused was calculated to have been eight pints and four ounces.

Among other measures which have been tried in these almost hopeless cases, and especially in those which were chronic, is the injection of iodine, as suggested by Velpeau in diseases of the serous cavities generally. Dr. D. Brainard, of Chicago, who has recently tried this method, employed a solution of iodine gr. $\frac{1}{4}$ th; iodide of potash gr. $\frac{1}{8}$ th; water f3ss, gradually increased to iodine grs. xii; iodid. potas. grs. xxxvi, and water 3j; all of which was injected, and with apparent benefit at the time of the report.¹ But further experience in its use is necessary, though analogy seems to present a probability of success. As the operation of paracentesis has as yet presented but little to encourage surgeons in its repetition, it may be well to try the effect of long-continued and gentle pressure by means of bandages or adhesive strips, as advised by Mr. Barnard, of England.

§ 4.—REMOVAL OF FUNGOID TUMORS OF THE DURA MATER.

The development of fungoid tumors upon the dura mater, sometimes leads to the absorption of both tables of the skull, and the appearance of the fungous growth directly beneath the integuments. From the nature of the parts involved, and from the observation of the cases, many surgeons have regarded this disease as hopeless; but as successful operations have been performed, and as the result of *post-mortem* examinations has often shown that the disease is frequently limited to the dura mater, or rather does not encroach upon the brain, the propriety of operating under even these dangerous circumstances is a question which the operator must decide for himself at the moment. Among the cases reported, one out of three of this apparently hopeless operation has succeeded, and the sur-

¹ Transact. Am. Med. Assoc. for 1850, p. 371.

geon may therefore deem a repetition of it advisable, although his prognosis should be guarded. In a case reported by Dr. J. C. Warren, of Boston,¹ a lady, twenty-two years of age, in 1846, had a tumor on the right side of the forehead and right temple, which had shown itself the preceding year. The tumor was smooth, uniform in its appearance, diffused in the surrounding parts, had no distinct boundary, was not discolored, somewhat elastic, not painful nor tender, and never had been. Nothing like a depression could be discovered in the central part. In 1847, the skin became ulcerated, and a fungus about the size of an egg showed itself. This was of a red color, without sensation to the touch, without pain or intellectual disturbance when pressed on, bled readily, and a probe penetrated the substance of the tumor to the depth of three inches, yet the patient recovered. The operation was performed as follows:—

OPERATION OF DR. JOHN C. WARREN.—An incision being made on four sides of the tumor, so as to make four flaps of the skin, the latter were separated from the fungous mass as exactly as possible; the soft and cerebriform matter cut away in detached portions, the disease traced through an irregular opening in the bone to the dura mater, and the actual cautery applied freely to the surface. The hemorrhage, which was great, was suppressed by two or three ligatures and the cautery, and the subsequent symptoms were of a favorable character. The wound healed slowly, but after some months closed entirely; has remained well ever since, and the patient has had no unpleasant feelings in her head, or any other symptoms of disease. As the case was witnessed by a great number of medical gentlemen, there can be no doubt as to the character of the disease.

In a previous case, in which the disease developed itself in a young man, it returned after removal, and caused death.

In the case of a lady, operated on in the Massachusetts General Hospital in 1828, the disease also returned, but the patient did not die until two years after the operation.²

Dr. Gross, of Louisville, has recently published³ the history of a case, which, in the hands of Dr. Jas. C. Johnson, formerly of Louisville, fully illustrates the fact that these cases frequently present

¹ Transact. Am. Med. Assoc. for 1850, p. 403.

² Warren on Tumors, p. 510.

³ History of Kentucky Surgery, p. 60, 1853.

examples of great tolerance of injury, and that operations upon them are not necessarily and promptly fatal. In this case, an old gentleman, after suffering excruciating pain for some time, was found to have on the top of his head a hard, firm, immovable, and indolent tumor, about the size of a pigeon's egg, which increased and became soft and pulsating, inducing the belief that it was aneurismal. An operation being decided on, a crucial incision three inches long denuded the tumor, which, on being disengaged from its attachment to the periosteum and dura mater, and elevated from its bed on the skull, was found to leave the latter perforated to the extent of about a quarter of a dollar in diameter. The hemorrhage, which was slight, was arrested, and the wound dressed in the usual manner with adhesive strips, a compress, and bandage. On removing the dressings on the eighth day, the tumor was found to be again springing up, rapidly acquired the size of a hen's egg, and was pedunculated. It was now excised a second time, but the hemorrhage was so profuse as to create apprehension. This being checked, the tumor reappeared in another fortnight, and was treated, by the advice of Dr. Dudley, by a sponge, compress, and adhesive strips long enough to reach from one side of the head to the other. The tumor, after being thus checked, again sprouted, and was treated by nitrate of silver, butter of antimony, the knife, and actual cautery, with but little benefit. Eighteen months subsequent to the first operation, an empiric, by caustics, removed the entire mass, until a cavity was left in the brain "capable of receiving a common-sized teacup." Many pieces of bone having come away, the destruction of the cranium had reached three inches in diameter. This patient now travelled a long distance, and did not die until nearly two years after the first notice of the tumor, no disorder of the brain having been indicated at any moment. No *post mortem* was permitted, but a manual examination indicated the presence of stalactiforme exostosis, &c.

In a case which was presented to myself recently, the *post-mortem* examination clearly showed that though the tumor sprang from the dura mater, and by pressure on the compact matter of the skull had expanded its fibres so as to form a spina ventosa like tumor, yet the under surface of the dura mater was not depressed by the tumor, and that the latter might, therefore, have been removed without causing any greater injury to the brain than that resulting from the application of a trephine.

REMARKS.—Although the character of these fungous tumors of the dura mater has long been well known, having been thoroughly described by Louis,¹ Abernethy, and others, all of whom entertained the opinion that they originated from the dura mater, or in the bones of the cranium, yet few surgeons have deemed it advisable to recommend an operation for their relief. Velpeau, however, in an able article upon the complaint,² states that, in his opinion, “extirpation is indicated in these cases of fungous tumors of the head as well as in those situated elsewhere, but that they, like other forms of cancer, also present contra-indications.” From reviewing the opinion expressed by him, in the article referred to, as well as from the results of my own experience, it may, I think, be assumed, as a rule, that, if the operation can be thoroughly performed without excessive loss of blood, the chances of the return of the disease and the ultimate cure of the patient may be placed on a par with the operations for cancerous developments in other portions of the body. In four cases which it has fallen to my lot to witness, the *post-mortem* examination of two not operated on satisfied me that the disease had progressed from the outer lamina of the dura mater towards the scalp, but had not encroached on the brain. In the other two cases, though the tumors were moderately developed, no operation was deemed advisable, and the subsequent result is unknown; but when last seen, one was rapidly progressing to ulceration. I would therefore feel disposed to attempt the removal of these tumors by the knife, or rather by it and the use of caustic potash, in such cases as would justify any one in operating for a malignant disease generally.

¹ Mémoires de l'Acad. de Chirurgie, tome vi. p. 361, edit. Fossone, 1837.

² Dictionnaire de Médecine, tome 10^{ème}, p. 532, Paris, 1835.

CHAPTER III.

OPERATIONS UPON THE FACE.

THE Face being composed of various parts, the operations required for their relief, when diseased, will be treated of under their special heads after a brief anatomical description of the portion concerned.

SECTION I.

GENERAL ANATOMY OF THE FACE.

The Face, as a surgical region, is bounded by the superciliary ridges above, by the base of the inferior maxilla below, and is formed by the superior maxillary, inferior maxillary, malar, nasal, palate, and ethmoid bones, together with those of the vomer, and inferior turbinated. Its external portion is composed of the skin, muscles, vessels, and nerves.

The skin of the face presents nothing of special interest to the surgeon. Its sebaceous follicles, especially upon the nose, are the occasional seat of tumors, which require the ordinary elliptical or crucial incisions for their removal. When any tumor upon the face is so situated that its removal will leave a wound in a very movable portion of the integuments, the use of a stitch or two of the interrupted suture will, as a general rule, prove to be a better means of uniting its edges than the employment of adhesive plaster.

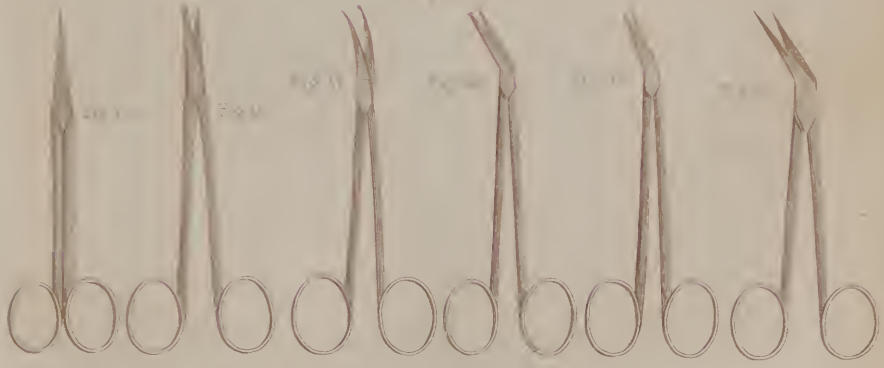
In all operations upon the integuments of the face, attention should be especially given to the line of the incision, in order that the cicatrix may be brought as much as possible within the folds created by the action of the subjacent muscles, the levatores anguli oris, zygomatici, and buccinators being those which are chiefly interested.

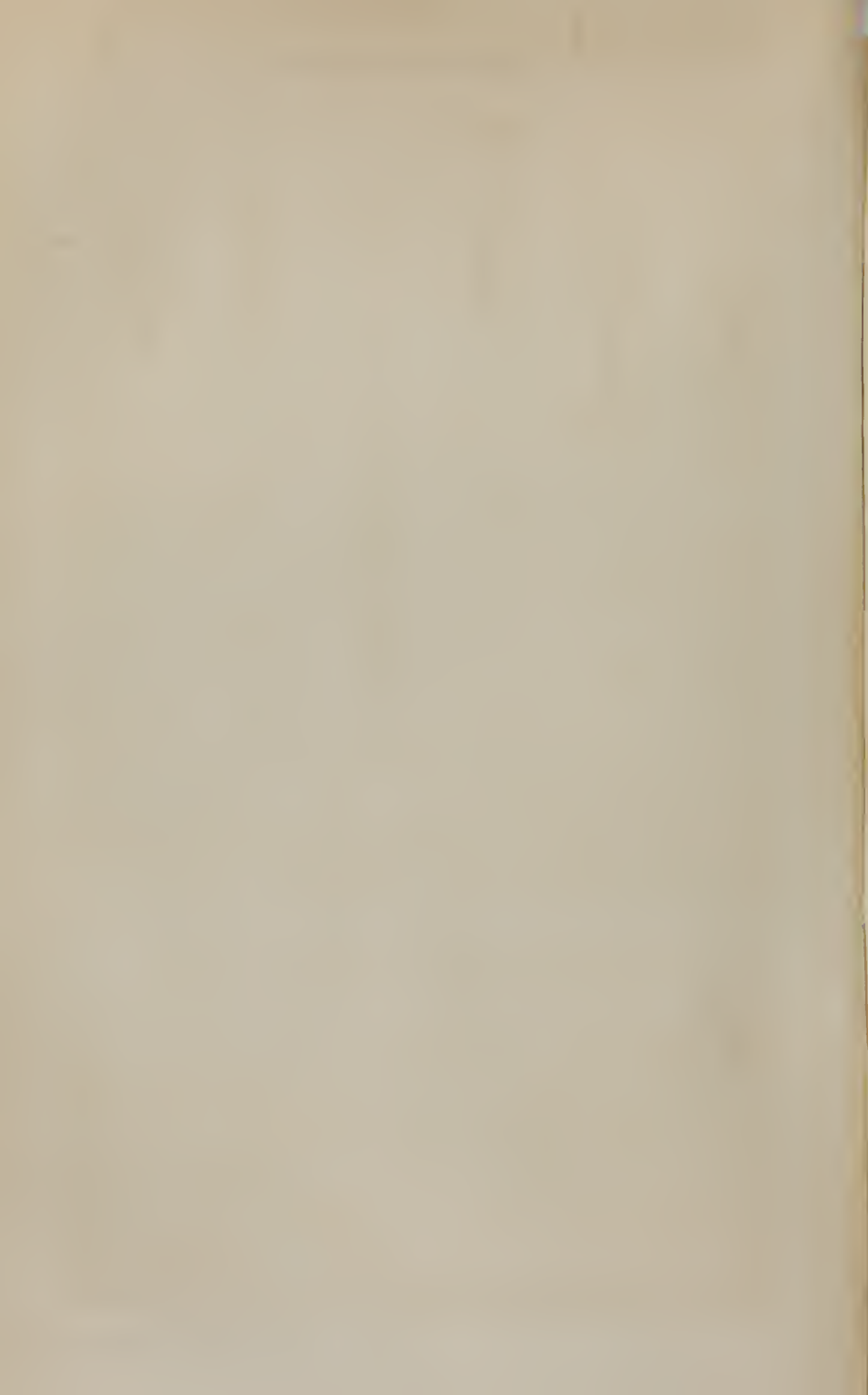
The action of the levator anguli oris and of the buccinator should also be especially recollected in the operations for harelip, their

PLATE VIII.

EYE INSTRUMENTS.

- Fig. 1. Desmarre's Bifurcated Forceps, for holding the skin during the passage of a suture. After Bernard and Huette.
- Fig. 2. Charriere's modification of Adams's Forceps. After Bernard and Huette.
- Fig. 3. Desmarre's Forceps for holding the upper eyelid during the removal of little encysted tumors. After Bernard and Huette.
- Fig. 4. Charriere's Rat-tooth Forceps. " " "
- Fig. 5. " Curved-pointed Forceps. " " "
- Fig. 6. Physick's Forceps, for perforating the iris in the formation of an artificial pupil—one end is a flattened plate and the other a punch, the iris being cut by closing the blades. From the Instrument.
- Fig. 7. Fine-teethed Forceps, for pterygium. After Bernard and Huette.
- Fig. 8. Self-acting Speculum of Drs. Ruschenberger and Goddard; the lower bar moves on the shaft, and is capable of resisting the contraction of the lids. With this instrument no assistant is necessary. Schiveley's Pattern.
- Fig. 9. A Silver Spring Speculum. " "
- Fig. 10. Anel's Syringe. " "
- Figs. 11, 12. Anel's Points, adapted to the syringe, when injecting the puncta lachrymalia. Schiveley's Pattern.
- Figs. 13, 14. Front and side View of Ware's style for fistula lachrymalis. Schiveley's Pattern.
- Figs. 15, 16, 17, 18, 19, 20. Fine Eye Scissors, of different shapes, both straight and probe pointed, and adapted to the operations of pterygium, strabismus, &c. Schiveley's Pattern.
- Fig. 21. A modification of Anel's Probe, for dilating the puncta in cases of epiphora. Schiveley's Pattern.
- Fig. 22. One form of the knife sometimes used to incise the conjunctiva in pterygium and strabismus. Schiveley's Pattern.
- Fig. 23. Hook of Dr. I. Hays, for seizing the muscle in the operation for strabismus. The curve is adapted to the convexity of the ball. Schiveley's Pattern.
- Fig. 24. The Elevator of Comperat, for sustaining the upper lid in operations for cataract. After Bernard and Huette.





contraction being the main cause of the difficulty experienced in uniting the wound after the operation.

The vessels of the face are principally branches of the facial arteries and veins, hemorrhage from which may be easily checked by compression at the point where the artery passes over the jaw, or by leaving the wound open to the air for a few minutes. Should this not suffice, then the ligature may be employed, but it is better to avoid this if possible, as the union is more perfect, and the scar less apparent subsequently. The nerves that supply the face are branches of the second branch of the fifth pair coming out at the infra-orbital foramen, or branches of the seventh pair, or portio dura, which, emerging at the stylo-mastoid foramen, are distributed to most of the muscles. The division of the main trunks of either of these nerves, in removing tumors or other operations upon the face, is apt to cause distortion of the features or loss of sensibility, though, in some few cases, the subsequent healing of the parts has restored the motion and sensation of the portion whose supply had been involved in the operation. But, in nearly every instance, as any deep incision must necessarily divide some portions of the nerves of the part, the surgeon can do little more than bear in mind the importance of avoiding them, if possible, or at least of not excising their trunks if they should be divided, as union may possibly restore their function.

The Face is subdivided into the regions of the eyes, nose, and mouth, the anatomical details of which may be briefly referred to before mentioning the operations practised upon them.

§ 1.—ANATOMY OF THE APPENDAGES OF THE EYE.

The appendages of the eye consist of the lids and the lachrymal apparatus.

The lids are composed of a thin, delicate skin, in which are numerous horizontal folds; of a loose and very movable cellular tissue, which latter is often the seat of encysted tumors; of a layer of circular muscular fibres, the orbicularis palpebrarum, and on the upper lid of a vertical muscle, the levator palpebræ, which together create the folds of the skin just referred to; and of two tarsal cartilages, which are thick upon the margin of the lids, thinner at the distance of a few lines, intermediate to the muscle and the conjunc-

tiva, and bevelled on their margin so as to secure a gutter for the tears. The cartilages tend to prevent the puckering of the lids, which would otherwise ensue upon the contractions of the orbicularis muscles. The levator palpebræ muscle is situated in the upper lid between the orbicularis and the cartilage; arising near the optic foramen, it is attached to the edge of the cartilage near its middle. The tensor tarsi of Horner, and the external tensor muscle of Mosely play important parts in keeping the cartilages applied against the ball, but do not require special attention from the surgeon. The conjunctiva or mucous coat of the eyeball is the last layer of the lids. It is reflected from the ball over the posterior face of the lids as far as the edge of the cartilages, and by its character as a mucous membrane favors the motion of the lid upon the eyeball. Between this membrane and the cartilages lie the Meibomian glands, or the tortuous canals, which open upon the edge of the cartilage, and lubricate its surface, thus preventing the escape of the tears over the lids, and also facilitating their passage along the grooved edge of the cartilages to the puncta lachrymalia or openings of the lachrymal ducts, found in the cartilages near the internal canthus of the eye. The cartilages are attached at the internal canthus by the internal palpebral ligament, which is also the point of origin of the fibres of the orbicularis palpebrarum muscle. Rendering this ligament tense by extending the lids towards the external canthus, furnishes a guide for the point of incision in puncturing the lachrymal sac in epiphora or fistula lachrymalis, if the swelling is not too great.

§ 2.—ANATOMY OF THE LACHRYMAL APPARATUS.

The lachrymal apparatus consists of the lachrymal gland which secretes the tears, of the puncta lachrymalia which receive them, and of the canals which conduct them into the nose.

The lachrymal gland (Plate XI., Fig. 1), is placed immediately below and within the external angular process of the frontal bone. Its secretion is emptied upon the eyeball by six or seven ducts which lie between the conjunctiva and the cartilage of the upper lid. It lubricates the part, facilitates the motion of the lids, and washes out small foreign particles, as dust, &c., accidentally introduced between the lid and the ball, or upon the ball. The course of the tears to-

wards the puncta lachrymalia generally carries such matter to the internal canthus.

The puncta lachrymalia, or openings of the canalicula lachrymalia, are found bordering on the internal end of the upper and lower tarsal cartilage, but are distinct from it. The upper punctum looks downwards, and the lower points upwards, and each in the ordinary condition of the part will admit a bristle. The lachrymal canals or ducts are situated immediately beneath the skin at the internal canthus of the eyelids, in their posterior margins and behind the orbicularis muscle. One is found in each eyelid, and is about half an inch long, the lower being rather the longer. In each lid the canals run perpendicularly at first, upward and downward from the free edge of the lid for about two lines, after which they converge and enter the lachrymal sac behind the internal palpebral ligament. Stretching or elongating the lids outwardly towards the temple will generally remove the angular commencement of the canals, and favor the passage of a fine probe into the sacculus lachrymalis.

The lachrymal sac (Plate XI., Fig. 1), is an oblong cylindrical cavity, or enlargement of the ductus ad nasum, situated in the depression of the os unguis and of the upper part of the same depression found in the nasal process of the superior maxillary bone. It is covered in front by the ligamentum palpebrale, as well as by a few fibres of the orbicularis muscle. The course of the sac is first slightly forwards and from above downwards, but from the level of the orbit it passes obliquely backwards at an obtuse angle with its course at first. It decreases as it descends, and below the edge of the tendon constitutes the lining of the bony ductus ad nasum, and is sometimes designated simply as the nasal duct. It is composed of two layers, an external fibrous one, continuous with the perosteum, and an internal mucous membrane which is continued from the puncta or even the conjunctiva, into the Schneiderian membrane. On a line with the floor of the orbit there is a doubling or valve formed in the membrane, and occasionally there is another at the nasal orifice formed by the Schneiderian membrane.

The position of these folds is certainly an objection to the introduction of sounds, from the nostril, into the ductus ad nasum, as recommended by Laforest. The length of the duct varies in different subjects, being on an average fifteen lines, and its inferior orifice is pretty regularly found beneath the inferior turbinated

bone about five lines from its anterior extremity (Plate XI., Figs. 1, 2), about seven lines from the bony orifice of the anterior nares, and about eight lines from the posterior inferior corner of the orifice of the nostril in the recent subject.

CHAPTER IV.

OPERATIONS ON THE APPENDAGES OF THE EYE.

THE disorders of these parts that require operations may be divided into such as involve the eyelids, and such as affect the lachrymal apparatus.

SECTION I.

OPERATIONS PRACTISED ON THE EYELIDS.

§ 1.—TUMORS OF THE EYELIDS.

Several of the tumors seen in other portions of the body are sometimes found developed in the eyelids. Most frequently they are a variety of the encysted tumor, which is seated in the cellular tissue, and readily removed either by incision of the cyst and the introduction of a sharp-pointed pencil of nitrate of silver, so as to create a slough of the sac; or by incising the integuments and sac, and drawing the latter out with fine forceps; or they may be dissected out, if care is taken to avoid cutting an opening entirely through the lids, as this is apt to prove difficult to heal, from the constant escape of tears through the wound. An important rule in removing these tumors by the knife, is to make the incision parallel to the course of the fibres of the orbicularis muscle, either through the skin from without inwards, or from the inside of the conjunctiva to the skin, according to the depth of the tumor. Usually, the tumor is removed from that side on which it seems to be most superficial, though the incision through the conjunctiva is least apt to produce a scar.

DESMARRES, of Paris, employs a pair of forceps with broad ends,

with a fenestra in one of the blades (Plate VIII., Fig. 3), well calculated to support the lid, and, at the same time, circumscribe the tumor, and when the surgeon cannot obtain proper assistants, these forceps will prove most valuable. Generally, however, this operation is too simple to require anything more than to close the lid, if the external incision is practised, or its eversion if the tumor is to be excised through the conjunctiva. Then the tumor being seized with fine and small forceps, or a tenaculum, may be readily dissected out. The operation of Desmarres, as well as that by eversion of the lid and incision of the conjunctiva, is shown (Plate IX., Figs. 1, 2.)

Vascular tumors of the lids are occasionally noticed, but unless of unusual size may be treated like the encysted class, by the means just detailed. In large aneurisms by anastomosis, or those of such size as to promise free hemorrhage, the production of inflammation in the tumor by the introduction of a seton through it, as practised by Mr. Lawrence, will generally answer a better purpose.¹

§ 2.—ENCANTHUS.

This complaint, named from its position (*εϛ*, in, *γωνος*, the angle of the eye), consists in an enlargement or degeneration of the caruncula lachrymalis. When requisite, the tumor may be removed by seizing it with a tenaculum or forceps, and excising it with fine-curved scissors, or with a small scalpel.

§ 3.—EPICANTHUS.

Epicanthus (*επι*, upon, *γωνος*, the angle of the eye) consists in the formation of a fold in the skin at the root of the nose, in consequence of which the internal canthus is, in a measure, concealed. It is a rare complaint, and occasionally requires an operation in order to enable the patient fully to expand the lids. The operation of Von Ammon, of Dresden, consists in pinching up a longitudinal fold of the skin, excising it at the root of the nose of a sufficient width to efface the epicanthus, either with the knife or scissors, and then uniting the elliptical wound thus made by a harelip suture. (Plate IX., Fig. 11.)²

¹ Lawrence on the Eye, by Hays, Philadelphia edition, 1847, p. 162.

² Bernard and Huette, p. 115.

PLATE IX.

OPERATIONS UPON THE EYELIDS.

Fig. 1. Extirpation of an encysted tumor from the upper lid by an incision on its external face. 1. The incision over the tumor. 2. Desmarre's ring forceps. After Bernard and Huette.

Fig. 2. Extirpation of an encysted tumor in the lower lid, by an incision through its mucous membrane. 1. Desmarre's bifurcated forceps holding the lid, as everted over 2, the handle of a cataract needle. 3. Fine forceps raising the tumor. 4. Its dissection by the straight bistoury in the line of the fibres of the orbicularis muscle. After Bernard and Huette.

Fig. 3. The ordinary operation for ptosis. 1. A pair of forceps pinching up the necessary amount of the skin of the upper lid. 2. The horizontal fold thus raised. 3. The scissors excising the raised portion, close to the grasp of the forceps. After Bernard and Huette.

Fig. 4. The shape of the wound, 1, 2, 3, left after the removal of the skin on the eyebrow—in Hunt's operation for ptosis. After Bernard and Huette.

Fig. 5. The wound united by fine harelip sutures, and its effects in elevating the lid. After Bernard and Huette.

Fig. 6. Weller's operation for ectropion of the lower lid by excision of the middle of the tarsus cartilage. After Bourgery and Jacob.

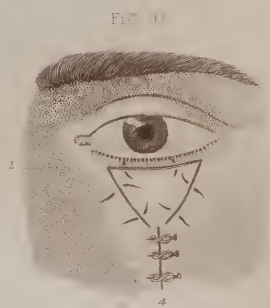
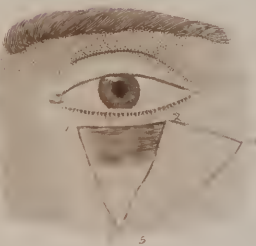
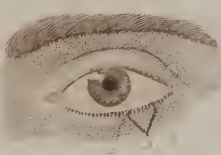
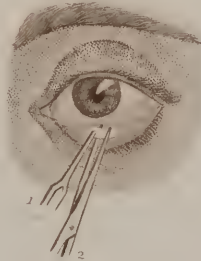
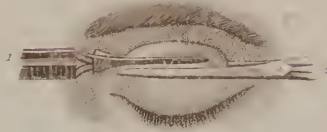
Fig. 7. Von Ammon's operation for symblepharon. The portion of the lid which is adherent to the ball has been included in the base of a V incision, 1 3, 2 3, which starting at the tarsus cartilage has been carried through the lid. After Bernard and Huette.

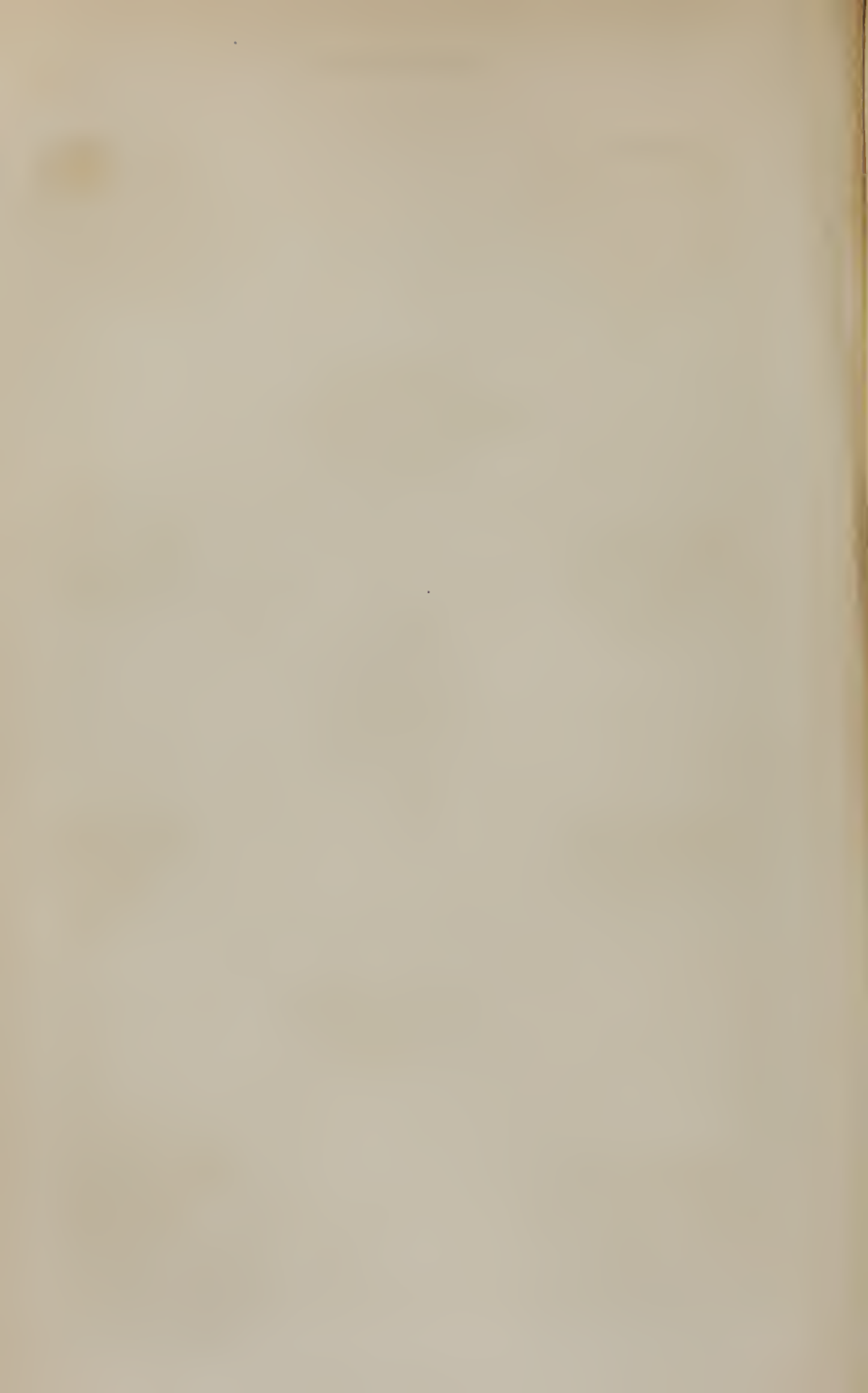
Fig. 8. The same operation completed; the edges of the incision through the skin and muscle of the eyelid, have been united by three harelip sutures, so as to leave a triangular fold of the conjunctiva attached on the edge of the tarsus cartilage, but otherwise free from the lid, thus favoring its motions on the ball. After Bernard and Huette.

Fig. 9. Dieffenbach's operation for the cure of a triangular wound of the lower lid, left in removing a tumor. 1, 2, 3. The wound. 4, 5. The flap which is to be inclined so as to close it. After Bernard and Huette.

Fig. 10. Jones's operation for blepharoplasty, or the formation of a new lid by sliding up a flap from the cheek. The operation is represented as completed. 1, 2, 3. The triangular flap raised from the cheek, and fitted into the lid by various points of the suture. 3, 4. Closure of the wound left by the removal of the flap from the cheek. After Bernard and Huette.

Fig. 11. Von Ammon's operation for epicanthus. 1, 2, 3. The elliptical wound resulting from the removal of a fold of skin at the root of the nose. After Bernard and Huette.





§ 4.—ANKYLOBLEPHARON.

This disease, so called from the preternatural adhesion of the edges of the lids, is generally the result of inflammation. The union may be either partial or total, and is usually found at the external canthus, where, if partial, a director may be passed between the lids and the eyeball, and the adhesions divided either by a probe-pointed bistoury or by probe-pointed scissors. If they are more extensive, and the eye is entirely closed, the lid may be raised in a vertical fold, and a small opening made through it at the external canthus in order to permit the introduction of the director; when the operator, after satisfying himself that the lids do not adhere to the ball (symblepharon), may pass a bistoury along the director, and divide the adhesions at the edges of the cartilages.

After the operation, care must be taken to prevent the reproduction of the complaint, by cauterizing the parts with the nitrate of silver; by separation of the lids by adhesive plaster; by collyria, or by liniments.

§ 5.—SYMBLEPHARON.

Symblepharon (*συν*, with, and *βλεφαρον*, an eyelid) is an adhesion of the lids to the ball of the eye, and generally the consequence of violent inflammation resulting from the introduction into the eye of caustic or other irritating substances, as a drop of oil of vitriol, or a particle of lime, or red-hot iron. Division of the adherent points by probe-pointed pterygium scissors (Plate VIII., Figs. 16, 17, 18), or, if slight, their laceration by a pin or cutting instrument passed between the lids and the ball, as practised by Amussat, will generally overcome the complaint. Or a double thread may be passed through the adhesion, and one end tied close to the sclerotica with great firmness, and the other towards the lid less tightly, as proposed by Petrequin; but care must be exercised to guard against the reproduction of the band.

As it has sometimes been found very difficult to prevent the renewal of the adhesions, the ingenious operation of Von Ammon may be resorted to (Plate IX., Fig. 7). Circumscribe by two incisions (1, 2, and 2, 3), through the whole thickness of the lid, that portion which is adherent to the eyeball, and the triangular flap thus

separated from the remainder of the lids will follow the eye in all its motions. Then, by two or three small pins and the twisted suture, unite the edges of the wound, so as to leave the triangular flap (Plate IX., Fig. 8), inside, and adherent to the eyeball, until the wound has fully cicatrized, when the flap may be dissected from the ball without any risk of the production of new adhesions.¹

§ 6.—PTOSIS.

Ptosis (*πτωσις*, a falling) signifies either a total or partial inability to raise the upper lid, and may result either from a congenital excess of integument, or from want of power in the levator palpebræ muscle, or from spasm of the orbicularis palpebrarum, in consequence of which the lid droops upon the eyeball. When such other remedial measures as are adapted to the case have failed in affording relief, an operation may become necessary in order to accomplish the mechanical elevation of the lid, and open the eye sufficiently for the purposes of vision.

OPERATION.—To accomplish this in the ordinary method, raise a transverse fold of the upper lid in a pair of forceps, and either with the scalpel or scissors (Plate IX., Fig. 3) cut off the portion thus raised, so as to leave an elliptical wound, which should not, however, include the conjunctiva, uniting the edges of the incision by two or three fine stitches of the interrupted suture. A very important point in the result of the operation, is the correct calculation of the amount of integument to be included in the fold seized by the forceps: if too much is raised, the patient may subsequently suffer from ectropion, or be unable to close the lid; and, if too little, it may become necessary to repeat the operation.

In the operation of Mr. Hunt, of Manchester (Plate IX., Fig. 4), the eyebrow is first shaved clean above the point at which a semi-elliptical piece is to be excised—the extent of the flap being calculated according to the amount of the relaxed portion of the lid. This flap may be circumscribed by an elliptical incision of the lid and eyebrow 1, 2, 3, the lower half being made first, and the upper dissected until it exposes the lower fibres of the *museulus frontalis*. Then, on uniting the wound by three stitches of the twisted suture,

¹ Bernard and Huette, p. 115.

the cicatrix will form in the eyebrow, and be subsequently concealed by the hair (Plate IX., Fig. 5). The adhesion thus formed between the lid and the frontal muscle will enable the patient to elevate the lid by the contraction of the muscular fibres just referred to.

§ 7.—BLEPHAROPLASTY.

The formation of a new eyelid at the expense of some portion of the adjacent integuments is termed Blepharoplasty (*βλεφαρον*, the eyelid, and *πλαστικός*, forming or formative), and may be required for the relief of cicatrices from burns, or for the loss of the substance of the lid resulting from the removal of large tumors, or in order to remedy an error consequent on an extreme miscalculation of the portion of integument removed in the operation for Ptosis just described, or for the cure of Ectropion. Under any of these circumstances, the ordinary rules for plastic operations¹ must be borne in mind, and especially the necessity of making an apparently excessive flap at first, in order to counteract the contraction which is so apt to follow all plastic operations, but especially those performed to remedy the defects of cicatrices. As the different methods of operating in plastic surgery will be described subsequently, the account at present may be limited to the operations usually resorted to in the formation of the eyelids.

OPERATION OF T. WHARTON JONES, of England, or the formation of a flap by stretching the integuments (Plate IX., Fig. 10). After having pared the edges of that portion of the lid which is to be renewed, so as to obtain a fresh surface, two incisions in a V, 1, 4, and 2, 4, are to be made near the wound, as upon the forehead, if in the case of the upper lid, or upon the malar or superior maxillary bone, if for the lower; the top of the V-flap, thus formed, being intended for adhesion to the lower portion of the lid. After thus circumscribing the flap, it should then be dissected from the base of the triangle 1, 2, to near the summit 4, and, when freed from the subjacent structure, excepting at its summit, it should be gently drawn upon until it fills in the desired space, when it may be retained in its new position by several stitches of the interrupted suture. The gap left in the portion from which it has been drawn may then

¹ See Operations on the Nose.

be closed by approximating the edges and uniting them with the harelip suture. The figure represents the flap 1, 2, 3 in its new position, and the union of the sides of the gap 3, 4 by the harelip suture, which thus converts a wound of some size into a mere line.

The reader will readily see, by reference to the figure, that the wound at 3 was of the width of 1, 2 previous to its elevation.¹

In the operation performed by DIEFFENBACH, of Berlin, or the formation of a flap by sliding the adjoining skin, a sufficiently triangular flap, 3, 4, 5, Plate IX., Fig. 9, was raised so as to fill the gap or wound 1, 2, 3, allowing, as before stated, for subsequent contraction, which may usually be calculated at about one-third of the whole flap. This being dissected free from its attachments, with the exception of its pedicle 3, 5, was afterwards slipped into the wound 1, 2, 3. The other gap, 3, 4, 5, from which the flap had been formed, was then left to cicatrize as a simple ulcer.²

In the German operations of GRÆFE and FRICKE, which are modifications of the ancient twisting of the flap as practised in India, the cicatrix, or diseased portion, was removed so as to leave a fresh surface, 1, 2, 3, 4 (Plate X., Fig. 1). Then a properly shaped flap, 3, 5, 6, of good dimensions, and at least one-third larger than the wound, was dissected from the adjoining sound skin, and twisted at 3, so as to adapt itself to its position. Being subsequently attached by the interrupted suture to the surrounding portion of the lid, the space caused by its removal was closed by the harelip suture, as in 2, 3 (Plate X., Fig. 2).³

§ 8.—ECTROPIUM.

Eversion of the eyelids, or Ectropium (*εκτροπιω*, to turn out), may result either from adhesion of the external surface of the lids to the surrounding integuments; from a diseased condition of the conjunctiva, or of the tarsus cartilage; or from irregular action or want of power in the orbicularis muscle.

In the milder cases of the disease, or those resulting from an hypertrophied condition of the conjunctiva, much may be accomplished by free leeching, astringent collyria, or cauterization of the conjunctiva in lines parallel to the fibres of the orbicularis, which,

¹ Bernard and Huette.

² *Ibid.*

³ *Ibid.*

though forming a linear cicatrix, is yet buried in the surrounding folds, and causes little irritation; or by the excision of a fold in the same direction, by raising it with the simple forceps, and removing it with fine scissors. But in more obstinate cases, blepharoplasty, or the formation of a new lid, must be resorted to, in order to enable the tarsus cartilage to apply itself properly to the ball. In these, as in all plastic operations, I repeat that it is important to avoid making the flap too small, as its contraction will continue for weeks subsequently; double the amount apparently required being often barely sufficient, after its adhesion in its new position.

I. BLEPHAROPLASTIC OPERATION FOR ECTROPIUM.

The following operations are a few of those of an original character that have been employed in the United States:—

OPERATION of Dr. WM. E. HORNER of Philadelphia.—Make an incision two inches long down to the bone parallel with, and at the inferior margin of the orbicularis muscle (Plate X., Fig. 8, 1, 2), dissecting up the whole thickness of the lid from the adjoining bones, then make another incision, 3, 4, an inch long from about the middle of the first downwards towards the angle of the jaw. From the termination of this, direct another, 4, 5, towards the point of the nose, so that the last two incisions shall define an angle of integuments, 6, which, being dissected up as far as its base, is to be turned into the beginning of the first incision.

The angle 6, or that taken from the cheek, being now inserted into the lower eyelid (Plate X., Fig. 9), and the angle 3 drawn to fill up the gap, pins should be fixed so as to keep the parts in place. An almost immediate correction of the deformity ensues, and ordinary dressings will be found sufficient to accomplish the cure.¹

Dr. BRAINARD, of Chicago, in a very bad case of ectropium of the left eye, resulting from a burn, modified Fricke's operation as follows:—

OPERATION.—The eyelid being first dissected up so as to place it in its natural position, a wound an inch and a half long by three-quarters of an inch broad was left beneath the lid. To fill this, a flap was taken from behind the external angle of the eye, of a cor-

¹ Amer. Journ. Med. Sciences, vol. xxi. p. 106, 1837.

PLATE X.

OPERATIONS FOR THE RELIEF OF AFFECTIONS OF THE EYELIDS.

Fig. 1. Blepharoplastic operation of Græfe on the upper Lid, effected by twisting the flap. 1, 2, 3, 4. The elliptical wound left in the upper lid by the removal of a tumor, &c. 3, 5, 6. The incision circumscribing a flap upon the skin at the external angle of the orbit, and destined to fill up the wound. After Bernard and Huette.

Fig. 2. A View of the operation as completed; the flap is retained in the lid by the sutures 1, 1, 1, whilst the space 2, 3, left by the removal of the flap, is closed by a fine harelip suture. After Bernard and Huette.

Fig. 3. Operation of Sir William Adams for Ectropium. 1. The first incision made through the lid by cutting from within to the tarsus; the edge of the tarsus beyond this incision is then held by 2, the forceps, and a triangular piece of the lid removed by 3, the scissors. After Bernard and Huette.

Fig. 4. Dieffenbach's operation for Ectropium. 1, 2. Longitudinal incision through the skin and muscle of the lower lid; the mucous membrane is then seized with 3, the forceps, and a fold excised with 4, the scissors; a suture unites all together, and the cicatrization of the conjunctiva in the wound inverts the edge of the lid. After Bernard and Huette.

Fig. 5. Desmarre's operation for Ectropium. 1, 2. The first incision at the external canthus. 2, 3. The second incision, which, commencing at 3, terminates at 2. 1, 4, 3, 4. Two incisions, which, starting from the terminations of the first, unite at 4 on a line with the reflection of the conjunctiva from the lid to the ball. After Bernard and Huette.

Fig. 6. The same operation, as completed. “ “ “

Fig. 7. Operation of Janson for Entropium. 1. Adams's forceps raising a fold of the skin of the lid near the internal canthus. 2. Scissors curved on the flat, excising the portion thus raised. 3, 4. The same kind of incision as completed near the external canthus. After Bernard and Huette.

Fig. 8. A View of Horner's operation for Ectropium in the right eye, resulting from a burn. 1, 2. An incision along the edge of the lower lid to free it from the cheek. 3, 4. A second incision, an inch long, from the middle of the first towards the angle of the jaw. 4, 5. A third incision from the termination of this towards the point of the nose. 3, 6. Two angular flaps formed by these incisions. After Horner.

Fig. 9. The termination of this operation. 1, 2. Lower edge of lid. 6. The lower angular flap raised to the edge of the lid, and fastened at its angle by a pin. 3. The upper angular flap depressed to fill in the gap. After Horner.

Fig. 10. Brainard's modification of Fricke's operation for Ectropium in the left eye resulting from a burn, the flap being taken from behind the external angle of the eye, and rotated upon its base so as to fill up the space left by detaching the lid from the cheek. After Brainard.

Fig 1

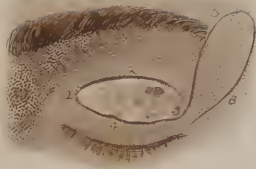


Fig 2



Fig 8



Fig 3

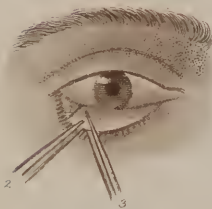


Fig 4

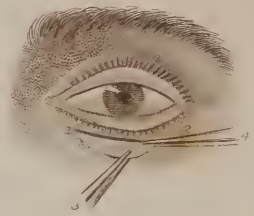


Fig 5

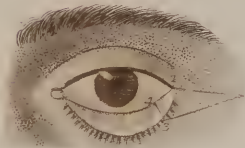


Fig 6



Fig 9



Fig 7



Fig 10



responding form, but somewhat larger, in order to allow of contraction (Plate IX., Fig. 10). This flap, being turned upon its base, was then brought into the wound left by dissecting up the lid, and retained there by numerous points of the interrupted suture; the wound created by the removal of the flap being subsequently closed by adhesive plaster and simple dressings. In two weeks the patient returned home relieved of the deformity.²

In the operation proposed by Sir WM. ADAMS in 1812 (Plate X., Fig. 3), which is especially adapted to cases in which the tarsus cartilage is much elongated, the edge of the lid was seized with forceps, and a V-shaped piece, of sufficient width at its base to restore the position of the lid (in some instances equal to four lines), removed with the scissors. The wound, being then united by one or two fine pins and the twisted suture, soon cicatrized.

DIEFFENBACH proposed to diminish the conjunctiva in order to restore the lid to its proper position. To accomplish this, he cut transversely through the skin on the outside of the lid, as at 1, 2 (Plate X., Fig. 4), and through all the thickness of the other tissues until he reached the conjunctiva, when, seizing this membrane with the forceps as at 3, he drew a fold of it out through the incision in the integuments, and excised it with fine scissors. Then, uniting the conjunctiva and the edges of the wound by a few stitches of the interrupted suture, the free edge of the lid was drawn up by the process of cicatrization.¹

DESMARRES, in order to avoid the cicatrix which arose from the operation of Sir W. Adams, proceeded as follows: He first made a horizontal incision, 1, 2, through the tarsus cartilage (Plate X., Fig. 5) at the external canthus; then a second one from 3, at such a distance from the first as corresponded with the size of the piece of the cartilage to be removed, carrying this incision to the termination of the first at 2. Then, uniting these by two others, 1, 4, and 3, 4, he excised this portion of the lid, and, uniting the whole wound by the twisted suture (Plate X., Fig. 6), caused the cicatrix to be concealed in the wrinkles found at the angle of the eye.

REMARKS.—When Ectropium is very marked, and especially when it is the result of cicatrization from the effects of burns, the plastic operations just referred to offer the best chances of success;

¹ Amer. Journ. Med. Sci., vol. x. p. 356, 1845. Also, Hays's *Lawrence on the Eye*.

² Bernard and Huette.

but if the tissue from which the flap is formed is not perfectly healthy, and indeed even when it has all its natural characters, the operator, according to my experience, may look for disappointment from its subsequent contraction, unless he is liberal in his calculations of the amount required to meet the subsequent contractions of the flap.

§ 9.—ENTROPION.

Entropion (*εντρεπω*, to turn in,) is the reverse of ectropion, and characterized by inversion of the lids, in consequence either of some change in the part, as relaxation of the integuments or contraction in the conjunctiva or cartilages, or as has been urged by Mr. HAYNES WALTON¹ to over action of a part of the orbicularis palpebrarum muscle, by which the eyelashes are brought in contact with the ball, and keep up a continual irritation. In this, as in the former affection, the treatment must be regulated by the cause. In the early stages the use of astringent collyria, or of adhesive strips to draw the lid outwards, or similar simple measures, may accomplish the cure if the deformity is not very great. The production of a slough in the skin by the linear application of a piece of soft wood wet with sulphuric acid, as proposed by Quadri, and the subsequent cicatrization of the ulcer may also answer, though it leaves a scar. But if these means fail, or if the disease is obstinate, an operation consisting in excision of the integuments will be required.

In many instances, the excision of the lid, as recommended in ptosis, will be found to answer a good purpose.

OPERATIONS BY THE EXCISION OF A PART OF THE LID.

JANSON, of Paris, drew the tarsus into its proper position by raising a vertical fold of the integument with broad forceps (Plate VIII., Fig. 2), and, after excising it with the scissors (Plate X., Fig. 7), united the wound by the twisted suture, as at 4, 5, of the same figure. If the excision of this one fold is not sufficient, two

¹ Op. Ophl. Surg., Am. Ed., p. 131, 1853.

or more may easily be added to it, until the lid is brought by the cicatrices to its proper relations with the eyeball.¹

OPERATION OF DR. JOHN SYNG DORSEY, OF PHILADELPHIA.—Dr. Dorsey having, in July, 1810, been led to the study of this complaint, concluded that half the eyelid might, if requisite, be cut off without much inconvenience, as the natural contractions of the orbicularis palpebrarum, by throwing the skin into folds, showed that much of the lid was naturally in excess. He therefore suggested the following operation:—

OPERATION.—Pass a hook through the edge of the eyelid, in order to gain a secure hold of it, and, with a pair of sharp scissors, cut out completely all that portion of the lid from which the cilia proceed. This wound healing readily, his patient was cured in a few days by the contraction of the lid. In two instances, he subsequently repeated this operation, and obtained favorable results.²

Mr. SAUNDERS, about the same period, suggested his method of operating, which was as follows: Introducing a thin plate of horn or silver, with a curvature corresponding to that of the eyelid, and with its concavity turned towards the globe, he stretched the lid upon it, and made an incision through the integuments and the orbicularis muscle immediately behind the roots of the cilia, to the tarsus, from the punctum to the external canthus. Then dissecting off the exterior surface of the tarsus until the orbital margin was exposed, he cut through the conjunctiva by the side of the tarsus, and disengaged the flap at each extremity, the only caution being to leave the punctum lachrymale uninjured. The fungus subsequently formed in the cicatrix was either cauterized or excised.³

When the inversion of the lid is due to a contraction or cicatrix in the conjunctiva or in the cartilage, and is the result of deep ulceration, the operations of Sir P. Crampton, or of Guthrie or Tyrrell may be employed.

SIR P. CRAMPTON'S OPERATION.—In this operation, the tarsus cartilage should be divided perpendicularly at each canthus by two incisions, each about three lines long, care being taken to avoid the punctum, after which a transverse incision of the conjunctiva should be made so as to unite the two vertical cuts. Two or three ligatures being then passed through the skin at its tarsal margin, the divided

¹ Bernard and Huette.

² Dorsey's Elements of Surgery, vol. i. p. 334.

³ *Ibid.*

portion of the eyelid is to be carried up to the eyebrow, and the ligatures fastened to the forehead by strips of adhesive plaster.

MR. GUTHRIE'S OPERATION.—This is a modification of Crampton's, and was performed as follows: Two perpendicular incisions, a quarter of an inch long, having freed the tarsus cartilage from its attachments at each end, and any vicious curvature of the cartilage being overcome by dividing it at the place where it is bent, a fold of skin of the length of the lid between the vertical cuts should be removed as close as possible to its margin. The edges of the wound being then united by fine sutures, the lid is to be secured to the forehead, as in the preceding operation, and caustic applied frequently to the perpendicular incisions, so as to cause them to heal by granulation.

In cases due to contraction of the orbicularis palpebrarum muscle, as suggested by Mr. Key, in 1825, and since urged by Mr. Haynes Walton, the following method of operation may suffice:—

WALTON'S OPERATION.—An assistant, standing behind the patient, and making the lid tense by drawing it outwards and forwards whilst raising the brow, the surgeon should make two incisions through the skin and muscle, one parallel with, and as close as possible to the roots of the cilia, and the other, so that it would form an elliptical flap of about three lines at its greatest width and terminate at each end of the tarsal cut, thus making an oval wound. The flap, thus isolated, being then forcibly drawn forwards and slowly dissected by vertical strokes of the knife, the wound should be closed by three or four fine sutures, and the cold-water dressing applied. The hemorrhage yields to the pressure of the finger or cold water applied before closing the wound. In fifty cases operated on in this manner, Mr. Walton has never seen a bad symptom.

REMARKS ON THE VALUE OF THESE OPERATIONS.—In estimating the value of the operations just detailed as practised on the eyelids, so much must depend upon the peculiarities of each case, that it is, perhaps, best to leave a decision of their value to the judgment of the moment. In deformities resulting in Ectropium, and consequent on burns or ulcers, the tendency to contraction is so great that, in all the plastic operations, too much integument can scarcely be obtained. In all such instances, blepharoplasty presents the best chances of success; but even then the operator should be very guarded in his prognosis. In the case of a young lady in whom the upper lid had contracted adhesions to the edge of the orbit, in con-

sequence of a burn, leaving the eyeball exposed to dust and other irritation, I formed a flap from the forehead, making it more than three times as large as the space to be filled in the lid, and, fastening it in position, obtained union by the first intention. Yet six months subsequently, the cicatrization of the wound from which the flap was taken, and the contraction of the latter, had again elevated the lid nearly to the edge of the orbit.

In Entropion, I should prefer the operation of Mr. Key, as modified by Mr. Walton, to most of the others. The operation of Dr. Dorsey is, I think, preferable to that of Saunders, not only from its simplicity, but from its completeness. In cases due to the contraction of the cartilages, the operation of Guthrie will generally be preferable to the operation of Mr. Crampton.

SECTION II.

OPERATIONS ON THE LACHRYMAL APPARATUS.

The principal disorders to which the lachrymal apparatus is exposed are scirrhus, or such other degeneration of the lachrymal gland as may necessitate its removal; and obstruction of the puncta lachrymalia, thickening and stricture of the ductus ad nasum, or suppuration and ulceration of the sac itself. At present, this account will be limited to such operations as are required by disorders of the tear passages; the removal of the lachrymal gland being usually accomplished by such means as are employed for the extirpation of other tumors, that is, by an incision through the lids, and the dissection of the gland from the surrounding parts. When the gland is removed, the loss of its secretion will be in a measure supplied by the increased action of the conjunctiva as a mucous membrane, its mucus being generally sufficient to favor the action of the lid over the ball. In contraction of the puncta lachrymalia, or of the canalicula lachrymalia, it occasionally becomes necessary, after employing antiphlogistic measures, and mild collyria, to dilate them by a probe, or to wash out the sac and ductus ad nasum.

DILATATION OF THE PUNCTA.—To one familiar with the anatomical relations of the part, catheterism of these ducts is a simple affair, and may be accomplished by introducing Anel's probe, or,

PLATE XI.

OPERATIONS PERFORMED FOR THE OBSTRUCTION OF THE LACHRYMAL PASSAGES.

Fig. 1. A side view of the relative positions of the different portions of the Lachrymal Apparatus of the left Eye. The upper and lower eyelids, with a small portion of the bones and integuments on the side of the nose, have been removed, so as to expose the structure freely. 1. The lachrymal gland in its natural position at the edge of the orbit, near the external angular process of the os frontis. The conglomerate structure of the gland is well shown. 2. The superior punctum lachrymalium, with the course of its canalicula, to the sacculus lachrymalis. 3. The inferior punctum lachrymalium in its course to the sac. The head, or enlargement of the ductus ad nasum, sometimes designated as the sacculus lachrymalis, is seen between the lines of 2 and 3. 4. The ductus ad nasum, exposed by removing its anterior parietes. Its course from the puncta down to the inferior turbinated bone, and the direction to be given to instruments introduced into it, can thus be readily understood.

After Bernard and Huette.

Fig. 2. A three-quarter View of the Face. Anel's probe has been introduced into the upper punctum and carried into the lachrymal sac, whence it may be made to enter the nose. The dotted line shows the course that the instrument would take, whilst the probe in the nostril indicates the position of instruments when passed into the duct from the nose, as in the plan of Laforest.

After Bernard and Huette.

Fig. 3. The position of the operator's fingers, when washing out the lower punctum with Anel's syringe. The mode of holding the syringe so as to prevent undue pressure on the canal, is also shown.

After Bourgery and Jacob.

Fig. 4. Operation of puncturing the Lachrymal Sac of the left Eye in cases of obstruction. The forefinger of an assistant is represented making traction on the lid so as to render the position of the palpebral ligament apparent, if the swelling and inflammation permit it. A straight narrow bistoury has punctured the integuments and anterior face of the sac, and whilst retained in its position, a probe has been passed along the blade of the knife into the duct and thence into the nose.

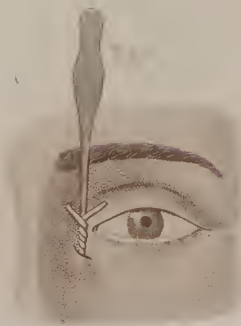
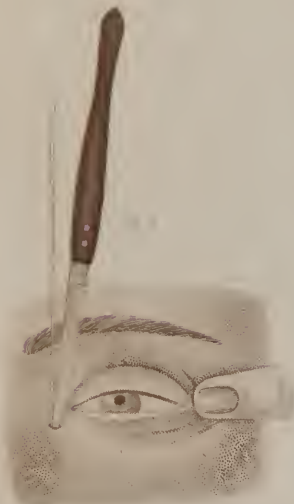
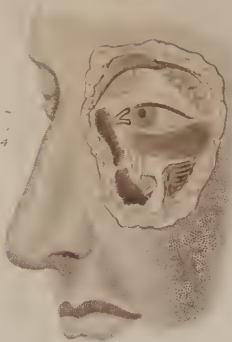
After Bernard and Huette.

Fig. 5. Operation upon the right Eye; the bistoury, after puncturing the sac, has been retained in its position until Ware's style could be introduced.

Modified from Bernard and Huette.

Fig. 6. Fistula Lachrymalis, and the introduction of a bougie into the duct through the fistulous orifice.

After Bernard and Huette.



what is better, the blunted point of a fine cambric needle fastened in a handle, or the instrument represented in Plate VIII., Fig. 21, into the punctum, and repeating the operation from time to time, as it may be required.

TO DILATE THE CANALS AND DUCTUS AD NASUM.—Draw the eyelid towards the temple, in order to straighten the canalicula and prevent a fold of the mucous lining from being pushed in front of the point of the instrument. Then introduce a fine probe, or one fastened into a light handle to facilitate its manipulation (Plate VIII., Fig. 21), into either punctum, by passing it perpendicularly into the orifice, and carrying the handle towards the temple, or nearly parallel with the lids, move it gently towards the inner canthus of the eye. On reaching the sac, elevate the instrument from the horizontal nearly to a perpendicular direction, and carry the handle obliquely forwards, when the point will pass readily into the nose (Plate XI., Fig. 2). The figure shows the probe when it has reached the sac and is about to pass into the duct, and the dotted line indicates its course downwards. The introduction of a probe from the nostril into the duct, as suggested by Laforest, is also shown in the drawing, but the operation has little to recommend it, being opposed to the anatomical relations of the parts, and the same end is better accomplished by operating from above.

TO WASH OUT THE CANALS AND SAC.—Introduce one of the fine points of Anel's syringe into the lower punctum, holding the instrument with the forefinger upon the piston, as shown in Plate XI., Fig. 3. Then elongating the lid, throw in the fluid by the motion of the forefinger, taking care not to press the point of the syringe into the membrane lining the canals, nor to push a fold of it in advance of the instrument. If the liquid does not pass out of the syringe as freely as the orifice should permit, withdraw the point a little, and again passing it forwards it will be easy to avoid any duplicature of the membrane. Whilst injecting either punctum, the other should be closed to prevent regurgitation. If the liquid passes freely through the duct, the fact will soon be rendered apparent by its escape either from the nose or throat of the patient, according as the head is held forwards or backwards. The liquid injected may consist either of simple water or of mild alterative collyria. If the operator can only use his right hand, he must stand either in front of, or behind his patient, according to the eye to be operated on, that is, in front for the left eye, and behind the patient

when operating on the right; but if he is ambidexter, his position will be immaterial.

FISTULA LACHRYMALIS.—When inflammation of the lachrymal sac results in suppuration, or when an abscess of this structure ulcerates, and opens upon the integuments, there is usually such a constriction of the ductus ad nasum as requires the introduction of a foreign body to dilate it and restore the patulous condition of its channel.

INTRODUCTION OF A BOUGIE OR STYLE, OR CANULA.—The introduction of any of these instruments requires the formation of an opening through the integuments into the sac, unless the discharge from the abscess has created an orifice by ulceration.

The **ORDINARY OPERATION** is performed as follows: Endeavor to render the ligamentum palpebrale prominent by drawing the lids outwards, as it is the great point of reference, the sac lying somewhat in front and below it. When on account of the swelling or inflammatory thickening of the integuments, the operator cannot feel this ligament, he must be guided in his puncture by the prominence formed by the distended sac, or by his knowledge of its proper position, and especially its relation to the edge of the orbit. Having decided on this, let him take a narrow, straight, and sharp-pointed bistoury, and, standing in front of the patient for the left eye, and behind him if the disease is in the right one, puncture the integuments and anterior surface of the sac by pressing the point of the knife (with its back turned towards the nose) obliquely downwards and backwards. On entering the sac, bring the handle to a nearly upright position, and carry it forwards, slightly towards the nose, and downwards, so as to make the point pass backwards and obliquely outwards and downwards (Plate XI., Fig. 4). Retaining the bistoury in the duct, pass a probe along the knife as a director until it reaches the nostril, and, withdrawing the bistoury, pass the style or bougie, or canula, along the course of the probe, and withdrawing the latter, fasten the instrument down by a piece of adhesive plaster, or simply trust to its retaining its position in consequence of the depth to which it has been introduced. Some surgeons, and especially the French, prefer passing the canula of Dupuytren along a groove made in the knife in order to conduct it into the duct with greater certainty; but in the United States, the style of Ware, with the head blackened by a little varnish or sealing-wax, and employed in the manner just directed, is almost universally resorted to. To

guard against a change in the relations of the soft parts, consequent on the escape of the pus, when the sac is opened, the employment of a probe passed into the duct before the bistoury is withdrawn, if the style cannot be passed in the first instance, will be found most serviceable; and I have more than once seen surgeons entirely baffled in the introduction of the style, in consequence of withdrawing the bistoury before the probe or style was fairly in the orifice made in the sac. From the collapse of the sac after its puncture, there is also, occasionally, risk of the style passing outside of the lining membrane or between it and the bony duct, so as to separate the former entirely from the bone, thus leading to entire obliteration of the cavity, as well as to disease in the os unguis. Whenever, therefore, great difficulty is experienced in introducing the style, caution in reference to this accident becomes necessary. If the duct is obliterated, a perforation may be made through the os unguis from the sac; but if it is only closely strictured, the practice of employing caustic, as recommended by Dr. Robert W. Haxhall, of Richmond,¹ will be found serviceable. The plan proposed by Dr. Haxhall is the same as that recommended by Ducamp in stricture of the urethra, viz., first to take a mould of the stricture by a soft bougie, and then apply lunar caustic to the constricted part. The same idea was previously suggested by Dr. Nathan Smith, of Dartmouth College, in 1817, though he employed caustic potash instead of the lunar caustic. His mode of using it is as follows:—

DR. NATHAN SMITH'S OPERATION.—Render the tendon of the orbicularis (lig. palpebrale) conspicuous, cut into the sac, introduce a probe, and find the obstruction. Then substitute a bougie armed with a morsel of caustic potash, press the alkali upon the opposing membrane, and the obstruction will soon be overcome, or the passage dilated.²

PERFORATION OF THE OS UNGUIS.—When the duct is so perfectly obliterated that its patulous character cannot be restored, then it may be necessary to make a perforation into the nostril by means of a punch (Plate XIII., Fig. 23), or a fine trocar, or the bone may be punctured and the fragments carefully picked out, in order to guard against the subsequent closure of the wound. To prevent extensive fracture or laceration of the neighboring parts, the puncture must be made with care.

¹ Boston Med. Magazine, p. 147, 1832.

² *Ibid.*, p. 403, 1833.

PLATE XII.

OPERATIONS PRACTISED ON THE EYEBALL.

Fig. 1. Excision of a Pterygium by the Bistoury. 1, 2. The fingers of the assistant who controls the lids. 3. The forceps seizing the pterygium, and raising it from the eyeball, whilst it is excised towards the internal canthus by the bistoury introduced beneath it.

After Bourguery and Jacob.

Fig. 2. A Vertical Section through the External Face of the Right Orbit, showing the Muscles of the Right Eye. 1. The eyeball. 2. Levator palpebræ superioris muscle. 3. Rectus superior. 4. Rectus externus. 5. Rectus inferior. 6. Inferior oblique muscle near its insertion. 7. The point of origin of the recti muscles near the optic foramen. The eyelids are seen in position.

After Bernard and Huette.

Fig. 3. A side View of the Sheaths of the Muscles of the Right Eye. 1. The eyeball. 2. The sheath of the levator palpebræ. 3. Sheath of rectus superior. 4. Sheath of rectus externus. 5. Sheath of rectus inferior. 6. Sheath of inferior oblique.

After Bernard and Huette.

Fig. 4. A front View of the Eyeball, showing the insertions of the Ocular Muscles into the Sclerótica, and their tendinous expansion upon the ball.

After Bernard and Huette.

Fig. 5. A front View of Hays's Operation for Strabismus, as practised on the left eye. The sound eye has been covered by a handkerchief, and the eyelids of the squinting eye distended by the spring speculum placed outside of the tarsus cartilage, whilst the surgeon, raising a fold of the conjunctiva near the internal canthus, divides it vertically with the seissors. The muscle, being thus exposed, is seized and divided as shown in Figs. 7. and 8.

After Nature.

Fig. 6. The Operation of Sedillot. 1. The speculum applied inside the lids. 2. A double hook inserted into the ball to steady it. 3. Forceps raising a fold of the conjunctiva. 4. Division of the conjunctiva by slightly-curved seissors.

After Bernard and Huette.

Fig. 7. An enlarged View of the Operation of Hays, showing the division of the muscle.

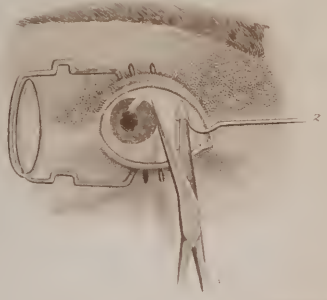
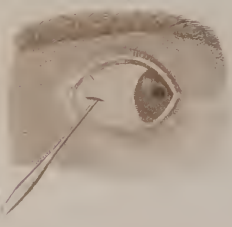
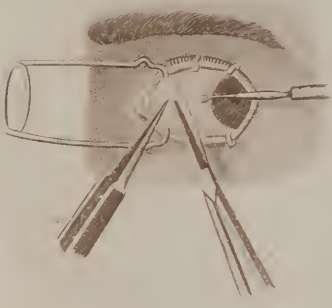
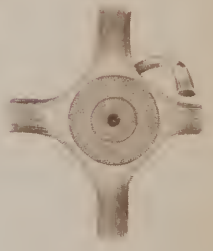
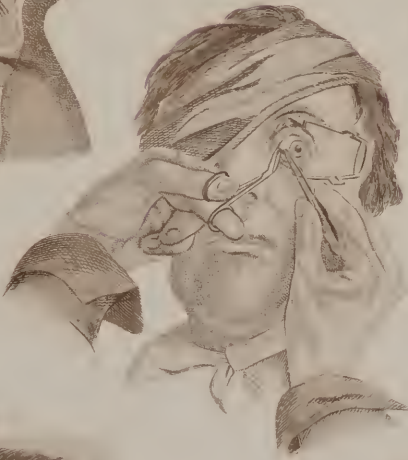
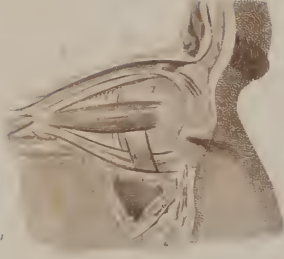
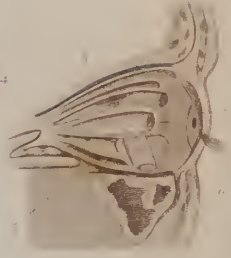
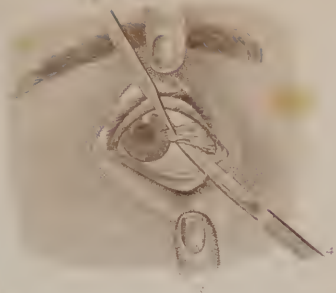
After Nature.

Fig. 8. The Muscle, as raised on a Hook.

After Bernard and Huette.

Fig. 9. Division of the Muscle in Sedillot's Operation; the chief difference being in the seissors and hook employed for this purpose.

After Bernard and Huette.



AFTER TREATMENT.—After the introduction of the style or bougie, they may be fastened in their position by a morsel of adhesive plaster, though, most frequently, the swelling of the integuments will be sufficient to retain them. After the lapse of six or eight days, the style should be removed by seizing its head with a pair of dissecting forceps, and withdrawn by a movement which is the reverse of that employed for its introduction. The point of a syringe being then placed in the canal, the part should be thoroughly washed, and the pervious character of the passage tested by the escape of the water either from the nostrils or into the throat of the patient. Then replacing the style, the same means should be resorted to from time to time, until all inflammation has subsided, after which common cleanliness is all that is requisite. The patient should, however, wear the style for at least six months, or until the permeable character of the ductus ad nasum seems well established. On finally removing it, the orifice will heal readily under the occasional application of the nitrate of silver.

REMARKS.—In the early stages of inflammation in the sac or its duct, the antiphlogistic treatment, and the dilatation of the passage by a probe passed through the punctum into the nose, will often suffice for the cure; but when the disease is more advanced, puncture of the sac and the subsequent introduction of a bougie or style in the manner just detailed will be requisite. Puncturing the os unguis is very seldom required when the surgeon is familiar with the relative changes of position necessary for the introduction of an instrument into the nose, and it should only therefore be attempted as a last resort.

CHAPTER V.

OPERATIONS UPON THE EYEBALL.

As the anatomical details of the eyeball are comparatively limited in their relations to operative surgery, they can readily be referred to in connection with the operations practised upon them.

The operations practised on the eyeball consist in those required by diseases of its tunics, muscles, and humors.

SECTION I.

OPERATIONS ON THE COATS, OR EXTERNAL PORTIONS OF THE EYEBALL.

The conjunctiva covering the eyeball being a reflection of that covering the lid, is liable, like it, to such a degree of inflammation, as may result in thickening, granulation, ulceration, or the development of accidental growths.

When, from violent or repeated attacks of ophthalmia, the conjunctiva is left in a hypertrophied or simply œdematous and thickened condition (Chemosis), and it is desired to excise one or two of the largest vessels, or a small fold of the conjunctiva, it is only necessary to raise the latter in a pair of fine forceps, and cut it off with scissors, according to the long diameter of the ball.

Granulations, even when exuberant, generally yield to the action of the lunar caustic, or to the sulphate of copper, applied either in solution or in mass. The fungous growths occasionally seen after the operation of strabismus, may also be treated in this manner, and if a warty growth be found upon the adnata, as reported by Dr. Physick,¹ the caustic will readily remove it.

PTERYGIUM.—Pterygium (*πτερυγον*, a wing), or a vascular thickening of a portion of the conjunctiva, on either side of the cornea, may be removed simply by seizing the growth with a pair of fine forceps, and excising it with the curved scissors usually known as pterygium scissors (Plate VIII., Fig. 17), or by dividing the vessels composing it transversely, and then cauterizing the wound with the nitrate of silver, so as to prevent reunion of the divided vessels.

SECTION II.

OPERATIONS ON THE MUSCLES OF THE EYEBALL.

Strabismus, or squinting (*στραβιζμός*, I squint), is a variation of the eye from the centre of the orbit, in consequence of which the parallelism of the optic axes is destroyed. This affection may result from various causes, but only becomes a fit subject for an operation when

¹ Philadelphia Medical Journal, vol. v. 1827.

positively dependent on spasmodic contraction of the muscles which move the ball. If the eye turns in, the squint is said to be convergent; but if the cornea is turned outwards, it constitutes a divergent squint. In addition to the deformity, this complaint also impairs vision, and it is in the latter case that surgical interference is especially demanded. If judgment is exercised in the investigation of the cause, and it is found that, on closing the sound eye, the patient with a convergent squint can turn the other eye towards the temple, then the operation may be attempted with confident expectations of success; but if, when the sound eye is closed, that which squints cannot be turned in the opposite direction to the squint, an operation will prove of little benefit to the patient.

§ 1.—ANATOMY OF THE MUSCLES CONCERNED IN SQUINTING.

The eyeball is moved by six muscles (Plate XII., Fig. 2), two of which are oblique and four are straight, the internal straight one being mainly concerned in the production of the convergent or most common form of strabismus. The straight muscles all arise from around the optic foramen, and are inserted by broad and thin tendons into the sclerotic coat of the eye about three or four lines from the cornea, Plate XII., Fig. 4.

The superior oblique muscle also arises from near the optic foramen, but the inferior oblique takes its origin from the nasal process of the superior maxilla at the side of the os unguis. Both are inserted into the sclerotica, about half-way between the cornea and the optic nerve. Between all the muscles and the conjunctiva is found a white fibrous membrane which lines the ocular conjunctiva throughout. This membrane extends from the palpebral ligament in front as far as the cornea, and then turning backwards forms a complete envelop for the sclerotica until it reaches the optic nerve, with the neurilemma of which it appears to be continuous. On the sclerotica it is very movable, and a layer of cello-cellular substance is interposed between them. At the points of insertion of the tendons, it is folded around them so as to form a fibrous sheath (Plate XII., Fig. 3), which degenerates into cellular tissue on the muscle.¹ This membrane is designated by Malgaigne as the Sub-

¹ Malgaigne, Operative Surgery, Phila. edit., p. 288.

conjunctival Fascia, and, in most cases of squint, requires to be divided.

In the operation for strabismus, it is, therefore, necessary to incise the conjunctiva and fascia, expose the muscle or its tendon, and divide it entirely, but without removing any portion, lest its subsequent power be entirely destroyed.

§ 2.—OPERATION FOR STRABISMUS.

The credit of suggesting the operation for the relief of squinting has been generally assigned by European writers to Stromeyer, but in the United States it is well known that he had been anticipated, and the operation performed many years before his account was published, by Dr. Wm. E. Gibson,¹ of Baltimore, who in 1818, operated in four cases, though he was subsequently induced to lay it aside from the opinion of Dr. Physick being adverse to it, the latter gentleman fearing that it would endanger vision. To Stromeyer, however, is certainly due the credit of having brought the operation into general notice in 1838, and to Dieffenbach belongs the honor of having established its success beyond a doubt. In the United States, this operation was subsequently performed by Dr. Willard Parker, of New York, in 1840, and by Drs. Pancoast, A. C. Post, Gross, Detmold, and Dixon, shortly afterwards, who in several papers called attention to its utility.² Since then, it has been repeated by nearly every surgeon. As the advantages of this operation appear, however, to have been doubted by many physicians, in consequence probably of the failures which have resulted from imperfect operations, or those injudiciously performed, I would state that the evidence of good operators yet continues to be favorable to it. Dr. Pancoast,³ who has operated in something like a thousand cases, expresses his decided conviction that there is no operation in surgery that yields more gratifying results; and my own experience, though much more limited, has led me to the same conclusion.

Various modes of operating have been employed by different

¹ Now Professor of Surgery in the University of Pennsylvania. See *Principles and Practice of Surgery*, vol. ii. p. 375, Philad. 1841.

² *Cooper's Surg. Dict.*; Appendix by Reese; article STRABISMUS.

³ *Medical Examiner*, vol. vii. N. S. p. 510.

surgeons, though all have the same object, to wit, the division of the contracted muscle, and only differ in the means employed.

STROMEYER controlled the movements of the eyeball by a fine hook inserted into the conjunctiva, elevated a fold of the same membrane in forceps, incised it with a cataract knife, and, raising the muscle upon a hook, divided it with scissors or a curved knife.

DIEFFENBACH elevated the upper lid with Pellier's speculum, depressed the lower lid by the finger of an assistant, drew the eyeball outwards by a fine hook in the conjunctiva, elevated a fold by another fine hook, incised the conjunctiva between the hooks with curved scissors, elevated the muscle on a curved hook, and divided it with the same scissors.

SEDILLOT separated the lids by a spring speculum, inserted a hook into the sclerotica to steady the eye, elevated a fold of the conjunctiva with forceps, and divided it with curved scissors (Plate XII., Figs. 6, 8, 9), pursuing in the remainder of his operation the course just detailed.

Dr. JOSEPH PANCOAST, of Philadelphia, operates very much in the same manner.¹ There is, however, according to my observation, no necessity for a hook to fix the eyeball, and the following plan, which I have frequently practised with success, and which is the process long pursued at the Wills Hospital, for the eye, in Philadelphia, is much more simple. To Dr. I. Hays, senior surgeon of the hospital, and editor of the *American Journal of the Medical Sciences*, is due its introduction into that institution, where it is now generally resorted to.

OPERATION OF DR. HAYS.—Dr. HAYS closes the eye, generally the soundest one, with a handkerchief or bandage, in consequence of which the affected eye becomes straight, if the case is a proper one for the operation. Then, having separated the lids by a speculum, he seizes a fold of the conjunctiva over the muscle, with a pair of good forceps (Plate XII., Fig. 5), elevates it, incises it with a snip of the curved scissors, divides the fascia, if necessary, in the same way, passes a *large* curved hook (Plate VIII., Fig. 23), having a convexity at least equal to that of the ball, beneath the muscle from below upwards, and divides it with the same scissors.

Seizing the conjunctiva in this manner is quite sufficient to

¹ Operative Surgery—Strabismus.

steady the eye, and the subsequent steps of the operation are equally simple.

AFTER TREATMENT.—A little cold water and a fine sponge usually suffice to check the slight hemorrhage resulting from the incision, when, if the muscle has been thoroughly divided, the patient will generally be able to keep the eye straight. The eye should then be left open, bathed frequently with cold water, and the patient directed to use it, while the other is kept closed. The use of a simple collyrium will generally relieve the conjunctival injection in a few days, when both eyes may be used, so as to acquire a proper parallelism of vision; but, occasionally, a little fungous growth results from the incision, and may require excision or to be removed by caustic, though it is not common except where the conjunctiva has been very freely divided.

GUERIN has proposed a sub-conjunctival division of the muscle as being least likely to permit that protrusion of the ball which is occasionally noticed when the primary incisions have been very free; but as the ordinary operation does not induce this when properly performed, and insures the more perfect division of the fibres of the muscle and its tendon, the plan has nothing specially to recommend it.

CURE OF STRABISMUS BY THE APPLICATION OF A TEMPORARY LIGATURE TO THE MUSCLE OPPOSITE THE SIDE OF THE SQUINT.

OPERATION OF TAVIGNOT.¹—The object of all the operations performed for the relief of strabismus being to bring the pupil to the centre of the orbit by elongating the contracted muscle, little or no regard is paid to the condition of that of the opposite side, which, from being kept constantly upon the stretch, is unable to resist the action of the muscle which causes the squint. To obviate this, M. Tavignot has proposed a new operation, the object of which is to shorten the muscle which is elongated, instead of elongating one that is contracted, as in the ordinary operation; he therefore operates as follows:—

FIRST OPERATION.—The longest muscle (say the external rectus

¹ Medical Examiner, vol. ix. N. S. p. 594; from Dub. Med. Press and Presse Méd. Belge.

in convergent strabismus) being exposed in the usual manner, a blunt hook, with an eye at its extremity, is passed underneath the muscle so as to detach it from the globe of the eye by lifting it up. The hook being then carried forward, so that its concavity may embrace the muscle at a little distance from its *aponeurotic expansion*, a silk thread is passed through the eye of the hook, and the latter removed, so as to leave the ligature under the muscle. By a double twist of the ends of the thread, a simple and resisting knot is formed, which is then tightened, and one end of the ligature cut off, the other being brought out at the corresponding angle of the eye and fastened by a little piece of plaster on the edge of the orbit.

The first effect of this ligature is to render the lateral fibres of the muscle more central, and thus induce its shortening; whilst the second is to develop such an adhesive inflammation as not only permanently fixes the abnormal juxtaposition of the muscular fibres, but also creates an adhesion of the muscle to the sclerotic coat. As the ligature is only a temporary application, and not intended to divide the muscle, it should be removed at the end of the second or commencement of the third day, by drawing gently on the end which remains.

Should this operation not prove sufficient, as would, perhaps, be found to be the case in very severe strabismus, another is to be performed thus:—

SECOND OPERATION.—The hook being passed under the muscle, as in the first operation, the ligature is to be passed not directly under the muscle, but under the hook, so as to embrace the *muscular expansion*. Then, in order to see if the globe is perfectly restored to its natural position, a different colored thread should be passed through the loop of the ligature, and a single knot formed in the first ligature so as to constrict the muscle, when the hook may be withdrawn, and the eye left to itself. If the globe is now not brought sufficiently back, a larger amount of muscular tissue must be embraced by the ligature; but if the globe is brought too far round, then a less amount must be inclosed—the ligature that constricts the muscle being in either case relaxed as soon as possible. Owing to the position of the colored thread, this relaxation can be readily accomplished by pulling one end of the ligature with one hand, and drawing the thread which was passed through its loop with the other, by which manœuvre the knot will be made to yield

readily. Then, passing the hook again under the muscle, recommence the operation, keeping in mind the experience just obtained as to the amount of the muscle to be constricted.

REMARKS.—The principle of this operation is so evident as to require no further explanation. As M. Tavignot in the account given has furnished no cases, this method of operating requires to be tested before its value can be estimated.

§ 3.—EXTIRPATION OF THE EYEBALL.

When, from malignant disease or other causes, it becomes necessary to remove the entire eyeball, it is of great importance that as much of the upper lid should be preserved as is possible, in order to protect the cavity of the orbit from foreign matter as well as to favor the subsequent use of an artificial eye.

ORDINARY OPERATION.—The patient being either seated or lying down, pass a large curved needle, armed with a strong ligature, through the ball, as far back as possible; remove the needle, and tie the ligature in a loop, so as to give the assistant the control of the tumor. Then incising the lids at the external commissure, carry the incision as far as the outer edge of the orbit, and rapidly dissect the lids from the ball by cutting through the reflexions of the conjunctiva. Now passing the scalpel or straight bistoury along the os planum (internal canthus), carry it around the orbit so as to divide the attachments of the two oblique muscles, and on reaching the external canthus remove, if requisite, the lachrymal gland. Then, without drawing too strongly upon the ligature, lest injury be done to the origin of the optic nerve, put the four recti muscles upon the stretch, and, passing the knife to the bottom of the orbit on its external side, free the attachments of the ball, and remove it, arresting the hemorrhage if it does not yield to cold cloths, by filling the orbit with dry lint. The advantage of the ligature over the forceps or volselum, as a means of controlling the tumor, will be found in the firmness of its attachment to the ball, owing to the fibrous character of the sclerotic coat. When scissors are preferred to the scalpel, they may be employed as follows:—

OPERATION OF DR. METTAUER, OF VIRGINIA.—Dr. Mettauer, of Winchester, Virginia,¹ has repeated Bonnet's operation in the following manner:—

¹ Stethoscope, vol. iii. p. 104, 1853.

The patient being in the recumbent posture, and under the influence of chloroform, the eyelids were divided as usual at the external canthus, and a curved needle and ligature passed through the ball so as to retain it in position. The eye being then drawn forwards, an incision was made by passing one blade of a pair of curved scissors through the conjunctiva and beneath the muscle on the inner side of the eye, as in the operation of strabismus. The four recti and two oblique muscles being thus divided close to their insertions, the optic nerve was cut by passing the scissors around it, and the eye removed.

The dressing was simply lint wet with water.

This case, two months after the operation, and another similarly operated on by Dr. Mettauer two years previous, were well at the time of the report.

REMARKS.—When cancer, or other disease, is limited to the eyeball, and the cellular and adipose tissue in the orbit is healthy, preference should be given to the mode of operating followed by Dr. Mettauer, as it is thorough, neat, and simple; but, in other cases, the older operation first detailed will be requisite in order to enable the surgeon to remove all the diseased structure from the orbit. The success of early extirpation of the eye in malignant disease is more marked than when it has been developed elsewhere, Dr. Robertson, of Edinburgh,¹ having cured twenty out of twenty-three cases. This operation is not, however, so universally favorable in its results, similar growths being apt to appear subsequently in the brain, or other organs, as is generally the case in operations for malignant diseases.

§ 4.—TUMORS IN THE ORBIT.

When tumors in the orbit are of such a size as to forbid their extirpation through the lids, it may become necessary to divide the external canthus, dissect them out, and then unite the wound by a stitch of the interrupted suture; a piece of linen wet with cold water being the only dressing that is generally required. When tumors, and especially those which resemble scirrhus, are found upon the tarsal cartilages, their removal may be accomplished by a V incision, or in a manner similar to that spoken of under the operation for Ectropion.

¹ *Opus citat.*, p. 104.

CHAPTER VI.

OPERATIONS PRACTISED ON THE HUMORS OF THE EYE.

AN account of the anatomical relations of the component parts of the eyeball may be limited either to a brief enumeration of the general characters of each portion, or extended into a minute description of the structures concerned. From the importance of the diseases of this organ, the latter course has generally been pursued by surgeons who have devoted themselves especially to this branch of the profession. The general character of the present work, and the necessity of affording to other subjects an equal amount of space, must, however, preclude any attempt at a more detailed account of them than is essential to the comprehension of the operations practised on them.

SECTION I.

ANATOMY OF THE EYEBALL.

The eyeball is composed of six coats and three humors.

The Coats are the conjunctiva, sclerotica, and cornea, which may be described as external; and the choroid, iris, and retina, which are within the former. The humors are the aqueous, crystalline, and vitreous.

The Conjunctiva, or mucous coat, after lining the lids, is reflected upon the ball, and covers both the sclerotica and cornea. To the sclerotica it is loosely attached by cellular tissue, in consequence of which it is liable to fluid infiltration, as well as to great vascular engorgement, either of which may raise it from the sclerotica. The course of its bloodvessels is tortuous. To the cornea it adheres very closely, furnishing it a thin layer, which is occasionally the starting-point of ulcerative inflammation. The Sclerotica is a dense fibrous coat which has, by some, been considered as an expansion of the dura mater of the brain. In connection with the operations

performed upon the eyeball, it may be described as extending from the optic nerve as far forwards as the circumference of the cornea, the two being closely adapted to each other by a bevelled surface. The resisting character of the sclerotica renders it necessary to press an instrument against it perpendicularly and with some little force, in order to perforate it readily. The vessels of the sclerotica are generally arranged in straight lines; hence their engorgement is readily distinguishable from that of the conjunctiva. The muscles of the eyeball are inserted into the sclerotica, and are consequently surrounded by the loose cellular tissue between it and the conjunctiva. The Cornea is a firm and resisting coat, seated at the front of the ball; it is composed of numerous laminae, separated from each other by a thin pellucid fluid in the healthy condition, but liable to become opaque from inflammation. The section of the cornea, owing to its density, and the arrangement of its layer, requires that the instruments employed should be of the best quality, and also that some caution be exercised by the operator, lest he simply separate its layers instead of passing the knife entirely through or behind them. The cornea possesses no vessels capable of carrying red blood in the healthy condition, though in inflammation its capillaries will admit it. In health, it possesses little sensibility; but, in disease, it is occasionally exceedingly sensitive, its incision having caused fainting, as occurred in the practice of Dr. Physick. Dr. Horner has also reported the same fact.

The Choroid is a vascular coat placed immediately within the sclerotica, and of equal extent with it, being closely fastened at its anterior margin to the corresponding portion of the latter, by a ring called the ciliary ligament. The Iris is set in the front margin of this ligament, so that the cornea and sclerotica may be peeled off without impairing its continuity with the choroid coat.¹ The arteries of the choroid coat are the two long and the short ciliary arteries. The long ciliary arteries pass one on either side, externally and internally, between the choroid and the sclerotica in the middle line of the eye. They are consequently liable to be wounded in the operations of absorption or depression of cataract, unless the needle is made to transfix the sclerotica a line or two above or below the plane of its transverse diameter, or very near to the circumference of the cornea.

¹ Horner's Anatomy, vol. ii. p. 414.

PLATE XIII.

EYE INSTRUMENTS.

- Fig. 1. Beer's Triangular Cataract Knife. After Bernard and Huette.
- Fig. 2. Richter's Knife, slightly differing in the width of the blade from that of Beer. After Bernard and Huette.
- Mr. Walton has recently shortened this knife, as stated in the text.
- Fig. 3. Wenzell's Cataract Knife. After Bernard and Huette.
- Fig. 4. Beer's Lancet-shaped Knife. " " "
- Fig. 5. Cheselden's Curved Corneal Knife, for incising the capsule, or enlarging the cornea in extracting cataract. Daviel's scoop or spoon is attached at the other end of the handle. After Bernard and Huette.
- Fig. 6. Beer's Straight Knife, for enlarging the incision in the cornea in the operation of extraction of cataract. After Bernard and Huette.
- Fig. 7. Beer's Hook, for extracting the capsule. " " "
- Fig. 8. A front View of Dupuytren's Couching Needle. After Bernard and Huette.
- Fig. 9. A side View of Dupuytren's Couching Needle. After Bernard and Huette.
- Figs. 10, 11. A side and front View of Adams's Couching Needle. After Bernard and Huette.
- Figs. 12, 13. A three-quarter and side view of Scarpa's Needle. After Bernard and Huette.
- Fig. 14. A side View of Walther's Needle. " " "
- Fig. 15. Benjamin Bell's Speculum. " " "
- Fig. 16. Pellier's Elevator. " " "
- Fig. 17. A modification of Wardrop's Forceps, for stretching the free edge of the eyelids in excising the tarsus cartilage. After Bernard and Huette.
- Fig. 18. A Tenotome, sometimes employed in strabismus, but better adapted to larger muscles. After the Instrument.
- Figs. 19, 20. Straight and curved Spring Scissors, for minute sections, and applicable to operations on the conjunctiva, &c. Charriere's Pattern.
- Fig. 21. Curved Forceps, for the removal of the canula, sometimes employed in fistula lachrymalis. Charriere's Pattern.
- Fig. 22. Fine blunt-pointed Forceps, for extracting the cilia in trichiasis, &c. Charriere's Pattern.
- Fig. 23. Laugier's Trocar, for perforating the os unguis, or the bony ductus ad nasum in fistula lachrymalis, when the ordinary channel cannot be dilated. After Bernard and Huette.
- Fig. 24. Bistoury for fistula lachrymalis. Schiveley's Pattern.
- Figs. 25, 26. Bellocque's Canula, for tamponing the nostril, showing the spring as open, and also as closed. Schiveley's Pattern.
- Fig. 27. Charriere's Exploring Needle. The needle being grooved and perforated, is passed into the cavity to be examined, and then the spring being touched, the piston of the syringe is moved, and draws into the syringe, through the grooved needle, some of the liquid contents of the part into which it is thrust in the exploration. After the Instrument.



The Iris is placed as a diaphragm behind the cornea, on a line with the ciliary ligament, and has the power of contracting and expanding, as will be referred to under the operations for cataract. The Retina has so little connection with operations on the eye as to require no special notice. Between the posterior surface of the cornea and the anterior face of the iris is the Anterior Chamber of the eye; and between the posterior surface of the iris and the front of the lens is the Posterior Chamber, the two communicating through the pupil, and being occupied by the Aqueous humor.

The Crystalline humor is a double convex lens, of which the posterior convexity is the greater. It is invested by a capsule, which is separated from it by the Liquor Morgagni. In consequence of the adhesion of the capsule to the hyaloid membrane, and the contact of the ciliary processes, the lens is readily maintained in its position; all the operations upon it consequently destroy these attachments. The Vitreous humor fills up the great bulk of the eye, and is directly behind the lens, the latter being received into a depression upon its anterior face. It is surrounded by the hyaloid membrane, which is strong enough to sustain it, and also prevent the depression of cataract, unless its cells are previously lacerated with the needle.

SECTION II.

OPERATIONS FOR CATARACT.

In the healthy condition of the humors of the eye and of the transparent cornea, the rays of light are so transmitted through them as to make the proper impression upon the retina. Any change in the transparency of the media through which these rays pass, necessarily impairs vision, and when this change results in opacity and is seated in any portion of the lens, it takes the name of Cataract. Various minute divisions of cataract have been made by ophthalmic surgeons, such as true and false, or black, white, and green, to the details of which it is unnecessary here to refer; the three grand divisions of the disease, according to the structure involved, into capsular, lenticular, and capsulo-lenticular, comprising all that it is essential to describe in connection with operative surgery. In membranous cataract, the opacity is supposed to

be limited to the capsule; in lenticular, it is either in the proper structure of the lens, or in it and the liquor Morgagni, the latter being very rare; whilst the term capsulo-lenticular cataract designates both varieties, and is the most common, the affection of the capsule alone seldom existing, except in a limited degree, without the early development of a similar complaint in the lens. Cataract has also been divided, according to its density, into hard, soft, milky, and cheesy, all of which may usually be recognized by the color.

Hard cataracts are generally of a brownish or amber color, are usually confined to adults, and are the kind especially adapted to the operation of extraction, although depression may relieve them.

Capsular cataracts are usually soft, of a brighter and lighter color than the preceding, and are often met with in children.

Milky or cheesy lenticular cataract is usually of a bluish or yellowish-gray, or white color, mottled, and with streaks in various directions through the structure.

Soft cataracts bulge forward, as a general rule, and, consequently, are apparently more superficial than the hard class; hard cataracts, on the contrary, are deeper seated and further from the pupil. All varieties commence with very much the same symptoms, such as dimness of vision, and an inability to see anything distinctly directly in the axis of the eye, the opacity most frequently commencing in the centre of the pupil.

DIAGNOSIS.—The distinction of the various kinds of cataract, or an accurate diagnosis, is of much importance, not only in order to decide on the propriety of an operation, but also to assist the surgeon in the selection of the kind of operation that he may perform for their relief. No means, within my knowledge, will prove more conducive to this object than the application of the catoptric test of Sanson. To accomplish this, dilate the pupil freely by means of belladonna, placing the patient in a dark room on a low seat, and passing a lighted candle transversely and vertically across the axis of vision. If the cornea, capsule, and lens are clear, three reflections of the flame will be seen, one large, upright, and superficial, formed by the front of the cornea; one deep, pale, small, and inverted image, formed by the posterior segment of the lens; and one deeper and upright figure, formed by the anterior portion of the lens and its capsule, a little brighter than the inverted image, but not so bright as the first. The absence of either of these images, or their absence

at any point, will indicate the character of the disease and the portion affected.¹

§ 1.—PRELIMINARY TREATMENT OF CATARACT.

As the result of the operations for cataract depend, in a great measure, on the absence of inflammatory action, attention to the adjuvants of the operation is essential to its favorable termination. In every instance, strict attention should be given to the healthy condition of the patient's system; let the surgeon see that there is no sign of fever, and yet that there is sufficient strength of pulse to insure adhesion of the flap in the cornea, if extraction is to be practised. Let him also see to a thorough evacuation of the bowels, as well as to the fact that there is no diarrhoea. As a general rule, a strict antiphlogistic diet should be observed several days before and after the operation; but if the patient is advanced in life, and the pulse becomes irritable, good diet and tonics may possibly prove beneficial. A very general rule, given in most of the works on ophthalmic surgery, is, "Never to operate on a patient with a foul tongue." Yet it has occasionally occurred to me to see patients who, from always having the tongue more or less furred, even in ordinary health, did very well when operated on under these circumstances. Indeed, no rule of general treatment can here be given that will not be found to have some exception to its universal observance. Caution and judgment in this, as in other operations, can alone properly prepare the patient's constitution.

The local treatment, previous to operating for cataract, consists in the employment of such collyria as will reduce the vascularity of the various coats of the eye and diminish the risks of their inflammation.

Another important step in the preliminary local treatment is the production of such a dilatation of the pupil as will enable the operator to obtain a good view of the lens, diminish the risk of wounding the iris, and admit the free access of the aqueous humor, if the operation of absorption is selected.

¹ See Lawrence on the Eye, by Hays, Phila. edit., 1847, p. 90; also Smith's Minor Surgery, for fuller details of the catoptric test.

§ 2.—DILATATION OF THE PUPIL.

Dilatation of the pupil may be accomplished by smearing the lids, eyebrow, and temple with the extract of belladonna or stramonium diluted with water to the consistence of thick cream, and applied every ten minutes for an hour previous to operating; or by dropping into the eye a solution of the extract; or their active principles (daturia or atropia) may be dissolved in water in the proportion of one grain to the fluidrachm of water, and a few drops be inserted about ten minutes before operating. The latter mode is the quickest and cleanest, but not quite so certain in all patients as the extracts.

I have occasionally employed the following formula, and found it very prompt, and not so dirty or irritating as the extract:—

R.—Atropiæ gr. iss;
Acid. nitric. gtt. ss;
Aquæ ℥ij.

Of this, a few drops may be introduced between the lids, and then a rag wet with the solution applied externally. The dilatation, in two instances, was prompt, and in one continued for three days after the operation, leaving the iris like a fine ring near the circumference of the cornea.

The credit of suggesting the employment of narcotic agents for dilating the pupil has been long assigned, by European writers, to Himley, of Gottingen, who recommended the use of the extract of belladonna in 1801.¹ Four years prior to this period, however, a similar suggestion had been made, and published in Philadelphia, by Dr. Samuel Cooper, a graduate of the University of Pennsylvania, who, in an inaugural essay, published in 1797,² reported numerous experiments on the effects of the datura stramonium on the system generally, as well as on the pupil of the eye.³ I have also been informed by Dr. Benjamin H. Coates, of Philadelphia, that Drs. Rush and Physick both taught this in their lectures, and that the latter always resorted to the formula of Dr. Cooper for its

¹ Lawrence on the Eye, by Hays, p. 366.

² Littell on the Eye, p. 262.

³ A Dissertation on the Properties and Effects of the Datura Stramonium, or the Common Thorn-Apple, and on its Uses in Medicine, by Samuel Cooper, M. D., 8vo. Philadelphia, 1797, p. 16, experiment 15.

preparation.¹ To the latter gentleman is, therefore, due any credit connected with the suggestion.

Another step in the treatment of cataract, previous to operating, is the application of a bandage on the eye opposite to that which is to be operated on, as advised by Celsus, as it tends very materially to steady the eye if there is any vision, especially in children.

The position of the patient, of the operator, and of the assistant, together with the period at which the operation should be performed, and the kind of operation to be selected, may also be placed under the same head, and be briefly referred to at present.

The position of the patient and the surgeon depends very much upon the kind of operation to be performed. For extraction, the recumbent posture of the patient is the best, as it adds to his safety by diminishing the tendency in the humors of the eye to escape through the opening in the cornea; but, in the operations of depression or absorption, it will generally be found more convenient to place the patient on a moderately low chair, with a side light, and let the operator sit directly before him on a higher stool or chair without arms, so as to be at perfect liberty in his movements. Some operators prefer following the advice of Scarpa, and employ a stool on which they place the foot, of the same side as the operating hand, resting the elbow on the knee thus raised. Such a position is, however, purely a matter of convenience, and one which, to many, would prove exceedingly embarrassing. If the surgeon's hand requires such a support to steady it, prudence should suggest that he had better lay aside his instruments.

The position of the assistant should be behind the patient, with one hand placed under the chin so as to steady the patient's head against his own breast; whilst the pulps of the index and second or ring finger of his other hand should be brought to the same length, and to the same level, so as to raise the lid by drawing the tarsus cartilage towards the superciliary ridge, where it should be retained until the surgeon directs its release. If the eyelid is moist and difficult to hold, the assistant should dry it thoroughly, or touch the points of his fingers in a little flour or other dry powder, previous to seizing the lid. A speculum, or the elevator of Pellier (Plate XIII., Fig. 16), may be resorted to if the orbit is

¹ Several copies of the Dissertation may be found in the Library of the Pennsylvania Hospital, Philadelphia.

deep, but, as a general rule, the eyelid may be best kept in position by the fingers placed as just described.

The period at which cataract should be operated on was once deemed a matter of importance, both as respects the season of the year, and the age, ripeness, or perfection of the opacity in the lens; but any season, with fine clear weather, will answer, whilst the best period, in reference to the maturation of the cataract, is that when its presence in both eyes is well ascertained. The existence of opacity being once well settled, it is best not to wait for the entire loss of vision or perfect maturation of the cataract, as every week after a well marked opacity is evident, is liable to increase the density and toughness of the diseased structure, and, consequently, add to the difficulty and risks of the operation.

Three kinds of operations are performed for the removal of cataract, to wit, extraction, absorption, and depression, the selection of either being usually decided by the following facts:—

1st. Absorption, depression, or reclinacion are attended with but little risk of the loss of the eye, and may be repeated as often as is necessary; they are well adapted to soft or hard cataracts, in which the anterior chamber of the eye and the eye itself are small. Depression of a hard cataract, it should, however, be recollected, is liable to produce amaurosis by paralyzing the retina; and not unfrequently a lens, when depressed, will rise again into the axis of vision.

2d. Extraction is an operation especially calculated for hard and firm cataract, but requires considerable dexterity on the part of the surgeon and his assistant, as well as a large prominent eye, with a full anterior chamber, on the part of the patient. Of the two operations, extraction is the more prompt and brilliant; absorption, depression, or reclinacion the safer. Drs. Physick and McClellan, in Philadelphia, and Roux, in Paris, favored extraction, but the majority of surgeons in the United States seem to prefer absorption or depression. From a recent publication,¹ by Mr. Sichel, of Paris, it appears that this distinguished ophthalmologist “has no exclusive preference for any operation, as he depresses hard cataracts in all ages, although he prefers their extraction in aged patients. He breaks up all soft or half soft cataracts in patients below forty, and especially below thirty; but extracts them

¹ Gazette des Hopitaux, No. 54.

in individuals over forty, and especially over fifty, as he finds that breaking up such cataracts in these patients is followed by swelling of the lens, which compresses the internal coats of the eye and causes violent inflammation. In patients below forty, and especially in children from six months to fifteen years, he has found the tolerance, after the use of the needle by a skilful hand, very great."

In order to operate upon both eyes equally well, whether the patient be placed in the sitting or recumbent posture, it becomes necessary for the surgeon to change his position, unless he is ambidexter, as he must otherwise operate upon the left eye with his right hand, whilst in front of the patient, and on the right eye with his left hand, if in front, on account of the prominence of the nose, whilst, if he wishes to employ the right hand in both eyes, he will be compelled to place himself behind the patient. Having considerable facility in using the left hand, a change of position has never been necessary in my case; and as this facility can be readily acquired by daily exercise, an operator will ultimately find it more satisfactory to attempt it, and practise with the left as well as with his right hand, in order to be able always to retain his position in front of the patient, as this offers many facilities in manipulation as well as in sight.

§ 3.—OPERATIONS.

The operations for cataract are, as has just been stated, divided into three kinds: absorption, or that in which the lens is dissolved by the action of the aqueous humor; depression, in which it is pushed below the axis of vision, and lies buried in the vitreous humor; and extraction, in which it is promptly removed from the eye. Reclination is a modification of depression.

I. OPERATION BY ABSORPTION.

The success of this operation being due to the power possessed by the aqueous humor of dissolving the lens, the object of the operator should be to lacerate it and its capsule, and throw them forwards into the anterior chamber of the eye. The preliminary steps in all the operations are very much the same, as respects diet

and the dilatation of the pupil; it is, however, of more consequence in absorption than in extraction to obtain a full dilatation of the pupil, not only in order to admit the free action of the aqueous humor upon the lens, but also to protect the iris from injury, and enable the operator to see exactly what he is doing. The needles required for cutting up the lens and its capsule are very varied, it being said that there are upwards of seventy different kinds, a few of which are shown, Plate XIII., Figs. 8, 9, 10, 11, 12, 13; they seem to have been selected very much at the fancy of each operator, though that of Saunders or of Scarpa is most frequently resorted to. All that is really essential is that they should have a sharp double edge.

ORDINARY OPERATION.—The capsule and lens being acted on by means of a needle introduced through the sclerotica, the operation has hence been called *scleroticomy*. The pupil being dilated, one eye bandaged, and the head supported against the breast of the assistant, or else the patient lying down, the surgeon should depress the lower lid with the index and second finger of the hand corresponding with the eye to be operated on, and the assistant, at the same time, elevate the upper lid as directed in extraction; or, if the operator is dexterous, he may sustain both lids himself, by separating them with his thumb and forefinger.

Then, seizing the handle of the needle between the thumb, fore, and second finger of the hand opposite to that of the eye to be operated on, and holding the instrument like a pen, with the fingers strongly flexed, and the little and ring finger resting against the cheek bone, present the point of the needle perpendicularly to the sclerotica, with its convexity upwards and its edges transverse, one or two lines behind the circumference of the cornea, and about half a line above or below the median line of the ball, so as to avoid the long ciliary artery. Being satisfied with its position, and whilst the patient is looking towards his nose, puncture the sclerotica, and rotate the handle of the instrument a quarter of a circle between the fingers; then turning the concavity of its point, if Scarpa's, or the breadth of the blade, if that of Saunders, backwards, pass it towards the centre of the eye, and depress the handle towards the temple. When the point, dexterously managed, has reached the centre of the pupil, turn the cutting edge of the needle to the cataract, and cut the capsule (Plate XIV., Figs. 3, 6) and lens into

several fragments, throwing them forwards into the anterior chamber, where they will subsequently disappear by dissolution.

If the cataract is soft and milky, one operation will generally suffice, but if the lens or its capsule is more resisting, it may become necessary to repeat the operation several times, at intervals of a few weeks.

AFTER TREATMENT.—The eye being closed and protected from the light, cold cloths may be applied, and the same treatment pursued as is directed in extraction. The pupil should, however, be kept dilated for several days after the operation, in order to permit the free access of the aqueous humor; and it is not requisite to enjoin such absolute rest as is directed in the operation of extraction. Should inflammation of the eye supervene, it should be treated on the general antiphlogistic plan.

When the capsule remains thickened, or when fragments do not disappear, a repetition of the operation will generally be required.

KERATONYXIS, or the operation of absorption by a needle introduced through the cornea, was suggested by Conradi, but introduced into practice to a considerable extent by Mr. Saunders, and is hence sometimes designated as his operation. It consists in introducing the needle through the cornea, and lacerating the capsule in front; but, as it is liable to give exit to the aqueous humor, induce prolapse of the iris, and leave a scar in the cornea, the operation through the sclerotica is preferable in the majority of instances.

II. OPERATION BY DEPRESSION OR COUCHING.

The preliminary steps of this operation being precisely the same as those required in absorption, a repetition of them is unnecessary.

ORDINARY OPERATION.—The position of the patient being either sitting or recumbent, and that of the surgeon being the same as in the preceding operation, the needle should be introduced into the sclerotica about two lines behind the cornea, and passed directly to the centre of the pupil between the iris and the capsule (Plate XIV., Fig. 8). Then depressing the handle, cause the point of the instrument to apply itself on the top of the lens, and depress it backwards and downwards, by elevating the handle and carrying it slightly forwards (Plate XIV., Fig. 7). After placing the lens in the vitreous humor below the axis of vision, retain it there

· PLATE XIV.

OPERATION OF COUCHING CATARACT.

Fig. 1. A vertical section of the Eyeball, to show its component parts.
 1. The cornea. 2. The sclerotica. 3. The choroid coat. 4. The retina.
 5. The iris. 6. The anterior chamber. 7. The lens. 8. The vitreous
 humor. 9. The optic nerve. After Bernard and Huette.

Fig. 2. Reclination of the Lens, as shown by a vertical section of the
 eye. 1. The natural position of the lens. 2. Its reclination in the
 vitreous humor. After Bernard and Huette.

Fig. 3. The operation of absorption, or breaking up of a cataract, as
 practised on the left eye. 1. The right hand of the surgeon puncturing
 the sclerotic coat. This puncture is usually made within two lines of the
 circumference of the cornea, and not as far back as is represented in the
 figure. 2, 2. The fingers of an assistant elevating the upper lid. 3, 3.
 The fingers of the left hand of the operator depressing the lower lid and
 steadying the ball. After Bourgery and Jacob.

Fig. 4. The different positions of the needle in the operation of Couch-
 ing, as performed upon the left eye. 1. The needle is now held in the
 right hand like a pen, the hand supported by the little finger resting on
 the cheek-bone; the needle is also represented puncturing the sclerotica
 at the usual point, that is about two lines behind the cornea, but below
 the transverse diameter of the eyeball. 2. The second position of the
 needle. 3. The elevation of the handle necessary for the entire couching
 of the lens, or the third position of the needle in this operation.

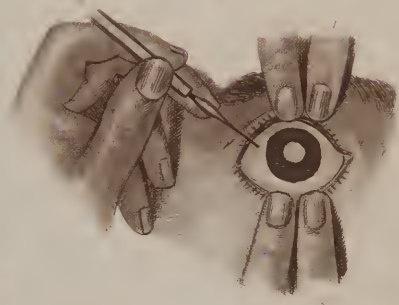
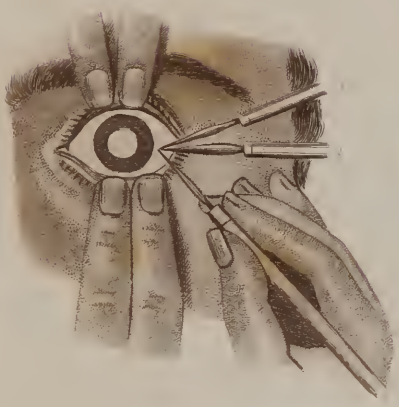
Fig. 5. Couching of Cataract in the right eye. 1, 1. The first and
 second fingers of an assistant raising the upper lid. 2, 2. The first and
 second fingers of the operator depressing the lower lid. 3. The cataract
 needle held like a pen in the left hand, the little and ring finger supported
 on the cheek bone, and puncturing the sclerotica about two lines behind
 the cornea, and a little above the transverse diameter of the ball, so as to
 avoid the long ciliary artery. After Bernard and Huette.

Fig. 6. Position of the needle in the act of lacerating the front of the
 capsule in the operation of absorption, as shown in Fig. 3.

After Bernard and Huette.

Fig. 7. The same operation, as the lens leaves the axis of the pupil;
 the handle of the instrument being moved gradually upwards, and the
 reverse, the point of the needle will carry the lens downwards and back-
 wards, until imbedded in the vitreous humor. After Bernard and Huette.

Fig. 8. The same operation as shown in Fig. 5, after the needle has
 entered the posterior chamber, and partially depressed the lens. 1. The
 relative position of the handle of the instrument to the axis of the eye at
 this period. The needle, having passed between the iris and the lens, is
 seen, with its concavity, resting on the top of the lens, previous to couch-
 ing it. After Bernard and Huette.



a few seconds, and withdraw the needle by reverse movements through the sclerotica, with its convexity forwards. The different positions of the needle during the operation are shown in Plate XIV., Fig. 4.

If the lens rises before the needle is removed, it must be again depressed, and if it escape into the anterior chamber, and cannot be drawn back, it may be removed by the section of the cornea, as in the operation for extraction.

In Reclination, the lens is turned on its axis so as to be placed horizontally instead of being depressed perpendicularly (Plate XIV., Fig. 2).

OPERATION OF MALGAIGNE.—M. Malgaigne being of the opinion that the rising of the lens, when depressed with its capsule, was due to the attachments of the latter being rarely totally destroyed, and to the fact that its capsule resisted absorption, and was liable to rise a long time after the operation, proceeds as follows:—

The patient lying down or being seated, and the surgeon placed either before or behind him, so that he can always use his right hand, the needle is introduced (as before directed) so as to pierce the posterior and inferior part of the lens; the capsule divided, and then the needle being passed above the lens with its concavity looking downwards, a simple movement of depression suffices to cause the descent of the lens, whence it will not rise again, as the walls of its capsule collapse immediately. This proceeding M. Malgaigne prefers, especially when the lens is hard.¹ Bretonneau and Velpeau lacerate freely the cells of the hyaloid membrane before depressing the lens, in order to prepare a way for its descent into the vitreous humor, and have found it often successful. About two months after either the operation of absorption or depression, the patient may very gradually commence the use of the cataract glasses, which are intended to aid vision, by supplying the place of the lost lens.

III. EXTRACTION.

The operation of Extraction is especially suited to the cases of hard cataract in adults with prominent eyes, and to operators who possess a perfect control of their fingers. The assistant must also

¹ Malgaigne's Operative Surgery, Phila. edit. p. 301.

be one perfectly familiar with his duty. He should place himself behind the patient, and elevate the upper lid either with his fingers placed as before directed, or by introducing Pellier's speculum beneath the lid, drawing it directly upwards, making himself sure that the lid cannot escape from his grasp, and yet holding it so as to avoid pressure upon the eyeball, after the section of the cornea. On one occasion, in 1839, I saw an assistant of Velpeau's evacuate the entire contents of the eye, in consequence of pressing upon the ball. Occasionally, and especially in timid patients, the surgeon may find it necessary to restrain the rolling of the eye by pressure on the ball with his fore and second or third finger, whilst depressing the lower lid; but it can rarely become necessary for the assistant to make any pressure upon the eye, and, as a general rule, it should be strictly avoided. Various-shaped knives have been recommended for this operation, and are known as those of Beer, Wenzel, Richter, and Ware,¹ but most surgeons resort to the triangular knife of Beer in preference to the others, except under peculiar circumstances. The other instrument consists in Daviel's scoop and Cheselden's knife, together with small scissors and forceps (Plate XIII., Figs. 5, 6, 7). The operation consists in three parts; incision of the cornea, laceration of the capsule, and extraction of the lens; although, occasionally, the first two are performed at the same time. The incision of the cornea may be performed either at the superior, exterior, or inferior portion of its circumference (Plate XV., Figs. 4, 3, 1). Mr. Lawrence deems the superior section the best, the exterior next, and the inferior the most objectionable, although the easiest to perform, as it exposes the patient to a rapid escape of the aqueous humor, to prolapse and wound of the iris, as well as to trouble in the adjustment of the corneal flap, from the action of the edge of the lower lid.² M. Sichel always extracts by the upper section, the advantages of which, he thinks, are very great, as the upper eyelid forms a kind of supporting bandage, which is still further increased by his method of applying five strips of adhesive plaster over the eyelids of each eye, and covering them by graduated compresses and a bandage, in such a manner as to exert a gentle compression on the edges of the wound, and prevents its becoming separated during the movements of the patient.³

¹ See Plate XIII., Figs. 1, 2, 3.

² Lawrence, by Hays, Phila. edit. 1847, p. 640.

³ Gazette des Hôpitaux, No. 54.

ORDINARY OPERATION OF EXTRACTION.—The propriety of dilating the pupil previous to extracting cataract, is a question not positively settled, its advocates claiming extra safety from wounds of the iris by the knife, and its opponents charging it with exposing the patient to the sudden loss of the vitreous humor. Although its dilatation certainly renders the iris more secure, yet I think a dextrous operator would probably prefer operating without dilatation, as the iris would be but little exposed to injury from a knife properly managed. The general preliminary measures being, however, completed, in accordance with the views of the surgeon, the operation may be performed as follows, varying the line of the incision according as it is wished to perform the superior, exterior, or inferior section. The former, being the best, may be taken as the type.

The surgeon, either sitting or standing, and being either in front of or behind his patient, according as he is ambidexter, or operates only with the right hand, should elevate the lid by the index and second finger of his left hand, separating them, and pressing their pulps against the sides of the eyeball, if it is necessary to steady it. Then holding the knife by its handle, with the thumb and fingers flexed, as in the downward motion of a pen, and resting the ring and little finger upon the cheek bone, if desirable, to support the hand, let him insert the point of the knife perpendicularly into the cornea on its temporal side, about half a line from its circumference, or line of junction with the sclerotica, and, making sure that the point of the instrument penetrates the entire thickness of the cornea, and enters the anterior chamber of the eye, and that it has not passed between its lamina, pass it parallel and in front of the iris, in the line of the transverse diameter of the eye, over to the internal side of the cornea at a point corresponding with that at which it entered (Plate XV., Fig. 4). If this is steadily and quickly done, the entire section of the cornea will be readily accomplished, simply by the width of the knife.

The assistant should now be directed to allow the lids to close. After a few seconds' rest, they may be gently wiped and opened as before, great care being taken to avoid pressure on the ball. Then, the surgeon, whilst elevating the lid, should press very gently against the ball, from below upwards, so as to render the lens prominent, or, introduce the back of the little knife attached to Daviel's curette beneath the edge of the corneal flap, and press its point against the

PLATE XV.

OPERATIONS FOR EXTRACTING CATARACT AND THE FORMATION OF ARTIFICIAL PUPIL.

Fig. 1. Extraction of the Cataract from the left eye, by the inferior section. 1, 1. The first and second fingers of an assistant raising the upper lid. 2, 3. The middle and forefinger of the surgeon depressing the lower lid. 4. The knife held in the right hand of the surgeon; its point, having passed through the cornea and across the anterior chamber, is seen at its exit near the internal canthus. After Bernard and Huette.

Fig. 2. The completion of the section of the Cornea. " "

Fig. 3. Extraction by the oblique section of the Cornea. " "

Fig. 4. Extraction by the superior section of the Cornea. " "

Fig. 5. Incision of the Capsule of the Lens, in the inferior section, by the knife of Cheselden, as modified by Boyer, but the knife that incises the cornea in extraction may also be made to cut the capsule as it passes across the lens. After Bernard and Huette.

Fig. 6. Expulsion of the Lens in the inferior section. 1. The forefinger of the operator steadying the lower lid. 2. Gentle pressure upon the ball by the handle of the knife applied to the upper lid. After Bernard and Huette.

Fig. 7. Section of the Cornea, by the knife of Furnari. " "

Fig. 8. The same operation, showing the removal of the cataract by forceps introduced through the opening in the cornea. After Bernard and Huette.

Fig. 9. Mulder's operation for Artificial Pupil. An opening in the cornea admits scissors, by which the four angles resulting from the crucial incision made in the iris are excised. After Bernard and Huette.

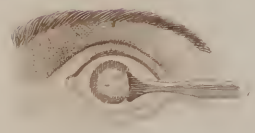
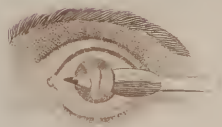
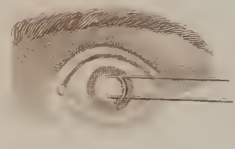
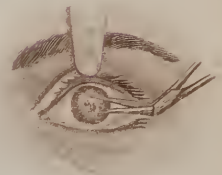
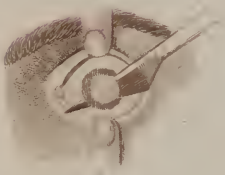
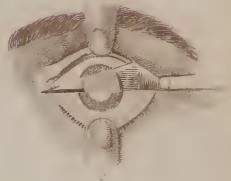
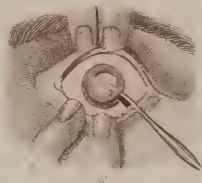
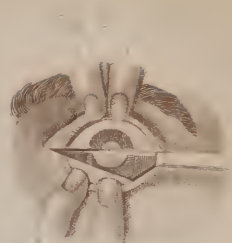
Fig. 10. Velpeau's operation for Artificial Pupil. The knife incising both the cornea and iris, so as to cut a flap in the lower portion of each. After Bernard and Huette.

Fig. 11. Pancoast's operation for Artificial Pupil in the first stage. 1. Finger of assistant holding up the lid. 2. The cataract knife puncturing the cornea and iris. After Pancoast.

Fig. 12. Pancoast's operation for the formation of an Artificial Pupil, in the second stage. 1. Finger of an assistant elevating the upper lid. 2. Probe-pointed scissors incising the iris transversely, so as to form a quadrangular pupil. After Pancoast.

Fig. 13. Langenbeck's operation for Artificial Pupil. A small incision is made in the cornea only large enough to admit a fine hook, by which a portion of the iris is drawn down, and left to adhere to the wound of the cornea. After Bernard and Huette.

Fig. 14. Scarpa's operation by displacement of the Iris. 1. A cataract needle is seen detaching the iris from the ciliary ligament, so as to leave an opening on its circumference. After Bernard and Huette.



capsule of the lens and lacerate it, as is shown in the inferior section in Plate XV., Fig. 5. Generally, the lens escapes promptly in consequence of the compression of the ball by the muscles of the eye. If it does not, moderate pressure against the ball with the handle of the curette (Plate XV., Fig. 6), or seizing the lens with the forceps, Plate XV., Fig. 8, or with the curette, will facilitate it; but in all these movements, great caution must be exercised lest the vitreous humor also protrude. The operator should then see that the iris has not prolapsed or been caught between the flap and the edge of the cornea; and, being satisfied that all is right, let him at once close the eye, and cover it with a light bandage so constructed as to exclude the light, without pressing upon the ball.

AFTER TREATMENT.—The after treatment must be regulated by circumstances, though generally it should be strictly antiphlogistic, the patient being directed to keep cold cloths applied over the lids of the affected eye, to remain quiet in a dark room, to take nothing but liquids for food, and to avoid conversation for the first three or five days. In most cases it will be found advantageous to keep the lids fastened by five little strips of adhesive plaster for a day or two, in order to prevent derangement of the wound by the motion of the lid, especially in intractable patients. The dressing employed by Sichel in the superior section, also requires, as has just been stated, the addition of graduated compresses and a bandage. On the fifth day, if the lids are not red or swollen, and the patient is free from fever and pain, the eye may be gradually opened, and the condition of the parts inspected. If there is no prolapse of the iris, if the pupil is clear and regular, and if there is no very high degree of inflammation, the rigid rules before observed may then be relaxed, and the patient simply use a shade instead of the wet cloths, chew a little bread or vegetable food, and be allowed by degrees to see the light. Subsequently, but not before two months after the operation, cataract spectacles may be occasionally employed, as the patient will be compelled ultimately to use them in order to compensate for the loss of the lens.

The performance of the inferior and exterior sections of the cornea are so similar to that just detailed as not to require a special description. They are well represented in Plate XV., Figs. 1, 2, 3.

SECTION III.

ANATOMICAL RELATIONS OF THE IRIS.

The Iris, by filling up the circular space left at the anterior portion of the choroid coat, constitutes a diaphragm or curtain, with an opening near its centre capable of transmitting or excluding, according to its size, the rays of light which pass through the cornea to the retina. Being a circular septum, the iris is attached only by its external circumference, adhering to the ciliary ligament, but yet in such a manner that it can be separated from it by gentle traction without injury either to itself or the ciliary body.

The Pupil, or opening in the centre of the iris, is capable of dilatation or contraction in certain conditions of the eye, in consequence of a peculiar power possessed by the iris; but whether this power is due to the action of muscular fibres, or the result of vascular or nervous action, is a point on which anatomists are not agreed. Dr. Physick taught that the contraction and dilatation of the pupil was due to the existence of two sets of muscular fibres, a series of those arranged circularly causing its contraction, and a radiated or longitudinal set producing its dilatation. As this fact has, however, been denied by Arnold and others, it is sufficient for all practical purposes to know that the iris possesses this power under the stimulus of certain causes, without attempting to explain how it is produced. The action of narcotic agents in producing dilatation of the pupil, together with the experiments of Dr. Samuel Cooper, of Philadelphia, in 1797, on the effects of Stramonium, have been already alluded to under the article on Cataract.

When, from a partial opacity of the cornea, or from contraction and closure of the pupil, vision is impaired, and light cannot be freely transmitted to the retina, the operation of forming a new pupil may be resorted to.

§ 1.—FORMATION OF AN ARTIFICIAL PUPIL.

This operation, originally suggested by Cheselden, of England, in 1728,¹ and performed by him on a boy fourteen years of age, was

¹ See Observations, &c. Cheselden's Anatomy, 13th edit. Lond. 1722.

published in the *Philosophical Transactions* for that year, and also in the appendix to the fourth edition of his *Anatomy*, as well as in Ledran's *Surgery*. Mr. Cheselden furnished, however, so brief a description of his plan as to create doubts in the minds of his contemporaries as to the various steps of the operation, though it was well understood that his object was the formation of an opening in some portion of the iris, which should serve as a substitute for the natural pupil.

These doubts, and the various changes produced by disease both in the cornea and iris, together with the diversified character of the causes creating them, have led other surgeons at different periods to various modifications of his operation, although they have followed the principle laid down by him; the creation of a new point by which the light might be transmitted to the retina being the object of all of them.

These different modes of operating have been classified under five heads.

1st. Division of the iris through the sclerotica, or through an opening in the cornea, called by ophthalmologists CORETOMIA ($\kappa\omicron\rho\eta$, the pupil, and $\tau\omicron\mu\eta$, a section).

2d. Excision of the iris, CORECTOMIA ($\kappa\omicron\rho\eta$, the pupil, and $\epsilon\kappa\tau\omicron\mu\eta$, excision).

3d. Separation or tearing of the iris from its ciliary attachments, called COREDIALYSIS ($\kappa\omicron\rho\eta$, the pupil, and $\delta\iota\alpha\lambda\upsilon\sigma\iota\varsigma$, dissolution or loosening).

4th. Separation and excision combined, or a modification of the corectomia of Wenzel.

5th. Distortion of the natural pupil. (Hays.)

I. CORETOMIA.

OPERATION OF MR. CHESelden, OF ENGLAND.—With a very narrow and pointed knife or needle, cutting on but one edge, Mr. Cheselden punctured the sclerotica about two lines from the cornea, as in the operation of couching. Passing the needle flatwise through the posterior chamber until its point had traversed two-thirds of its transverse diameter, he cut through the iris from behind forwards, by a sawing motion, and withdrew the instrument as it entered.

II. CORECTOMIA, OR EXCISION OF THE IRIS.

This operation was originally performed by Wenzel in 1780.

OPERATION.—Introducing a cataract knife through the cornea, as in extraction, Wenzel carried its point through the iris, and made a slit in it of sufficient length to permit free vision, taking special care not to press upon the eye lest its contents should be evacuated. On withdrawing the knife, the escape of the aqueous humor caused a flap in the iris to bulge forwards, and this being increased by gentle pressure with the finger on the ball, a portion of the iris was then cut off with fine scissors.

OPERATION OF DR. PHYSICK, OF PHILADELPHIA.—Dr. Physick made a section of the cornea and iris by a cataract knife, in a manner similar to that performed by Wenzel, and, introducing through the opening a pair of forceps (Plate VIII., Fig. 6), terminating in small plates, one of which contained a sharp circular punch, similar to that used by saddlers, he seized the iris between the blades, and cut out a piece by closing the plates of the instrument.¹

OPERATION OF BEER.—After incising the cornea, Beer introduced a fine hook or toothed forceps, seized the iris, drew it out, and cut off the projecting portion with the scissors.

OPERATION OF VELPEAU.—Velpéau punctured the cornea with a thin, long, double-edged knife, resembling the serpent-tongued lancet; then passing the point through the iris, from before backwards, penetrated the posterior chamber, and, passing a line or two across it, brought the knife out again into the anterior chamber, by cutting through the iris from behind forwards. Passing the point again through the cornea, he cut a flap both in the iris and cornea at the same moment (Plate XV., Fig. 7), the flap in the iris retracting upon itself, and leaving a triangular artificial pupil.² This operation is also but a modification of that of Wenzel.

Mulder, after incising the cornea, introduced fine scissors, and cut out the four angles of a crucial opening made through the iris (Plate XV., Fig. 9).

OPERATION OF DR. PANCOAST, OF PHILADELPHIA.³—Dr. Pancoast

¹ Dorsey's Surgery, p. 347, Philadelphia, 1823.

² Bernard and Huette, p. 153.

³ Operative Surgery, 3d edit., p. 218.

having modified the operation of Maunoir, forms the artificial pupil as follows: The patient being seated in a good light, an assistant raises the upper lid whilst the surgeon depresses the lower and enters the point of Wenzel's cataract knife into the cornea at the usual place for extraction. As soon as the point is seen in the anterior chamber, the handle is brought forwards and the point directed obliquely backwards upon the iris, so as to pierce it at about half a line from its ciliary margin, where the lens is most distant from it, and least liable to injury. As soon as this puncture is made, the handle is carried backwards, so as to bring the iris forwards on the point of the knife, which is then carried on so as to divide both the iris and cornea, until the point of the instrument has advanced half-way between the place of puncture of the iris and the closed pupil (Plate XV., Fig. 11), when the instrument is to be carefully withdrawn, the escape of the aqueous humor being very slight when this is well done. The incision of the cornea should be about one-fifth of its circumference, and that of the iris should have a shape concentric with its outer margin.

The delicate probe-pointed scissors of Maunoir being then inserted, closed and flatwise, through the corneal opening, should be slightly opened, and the handles turned so as to look obliquely downwards and forwards, so that the blade next the cornea may not injure it. Then, one blade being carried through the puncture of the iris, behind that membrane and the other in front, as far as the centre of the old pupil (Plate XV., Fig. 14), the handles are to be brought directly horizontal, and the second incision made by closing them. Not a drop of blood will escape, and an artificial pupil will be at once formed, which will be widest at its centre. The subsequent use of belladonna for a few days assists in keeping the new pupil dilated as widely as possible.

III. COREDIALYSIS, OR LACERATION OF THE IRIS.

This operation, as suggested by Scarpa, was performed by him, in 1801, as follows:—

OPERATION OF SCARPA.—“The patient being seated and held as in the operation for cataract, the sclerotic coat is to be punctured with a needle (Scarpa's) about two lines from the union of the sclerotic with the cornea, and the point of the needle made to advance

as far as the upper and internal part of the margin of the iris, that is, on the side next the nose. The instrument should then be made to pierce the upper part of the internal margin of the iris close to the ciliary ligament, until its point is just perceptible in the anterior chamber of the aqueous humor; I say just perceptible, because that part of the anterior chamber being very narrow, if the point of the needle is made to advance ever so little before the iris it must pass into the substance of the cornea. As soon as the point of the needle can be seen in the anterior chamber, it should be pressed upon the iris from above downwards, and from the internal towards the external angle, as if with the view of carrying the instrument in a line parallel to the anterior face of the iris, in order that a portion of its margin may be separated from the ciliary ligament. This separation being obtained, the point of the needle should then be depressed in order to place it upon the inferior angle of the commenced fissure, which may be prolonged at pleasure by drawing the iris towards the temple, and carrying the instrument from before backwards, in a line parallel to the anterior surface of the iris, and the greater axis of the eye."¹ (Plate XV., Fig. 14.)

OPERATION OF LANGENBECK.—This surgeon opened the cornea by a small knife or needle, and then, passing a fine hook through the wound, with its convexity presenting upwards, carried it through the anterior chamber with the hook presenting flatwise between the cornea and the iris to the very margin of the latter. Then, turning its point against the iris, he transfixed it by gentle pressure, drew the hook and the iris very carefully through the wound, drawing upon the iris until the new pupil was sufficiently large, and, finding that the iris when not drawn upon would remain in the wound, he withdrew the hook and left the iris to contract adhesions in the opening of the cornea (Plate XV., Fig. 13). It is essential to the success of this operation that the opening in the cornea should not be larger than is requisite for the introduction of the hook, otherwise it will be difficult to retain the prolapsed portion of the iris in the wound.

¹ Observations on the Principal Diseases of the Eyes, by Antonio Scarpa. Translated from the Italian, by James Briggs, Surgeon, Lond. 1806, p. 412.

IV. DISTORTION OF THE NATURAL PUPIL.

Dr. Isaac Hays, of Philadelphia, in 1840, formed an artificial pupil by the following operation:—

OPERATION.—The patient lying down, the lower lid of the right eye was depressed by an assistant, and the upper lid held by the operator with the two forefingers so as to steady the ball with the third finger. Then a section of the cornea, commencing near its junction with the sclerotica, a little below its middle, and extending so as to divide one-fourth of the circumference, was made by a cataract knife being carried steadily and quickly forwards so as to prevent the escape of the aqueous humor, and prevent prolapse of the iris before the incision was completed. As soon as the knife was withdrawn, the humor escaped with a gush, and the lids were allowed to close, and, on separating them after the lapse of a minute or two, the iris was found prolapsed so as to draw the lower edge of the pupil quite to the incision. The patient subsequently enjoyed excellent vision.¹

AFTER TREATMENT.—After any operation for artificial pupil, it is of great consequence that the antiphlogistic treatment, with the use of belladonna or atropine, should be rigidly observed, the strictest attention being given to the prevention of vascular excitement, by diet, venesection, purging, and cold applications outside of the lids.

REMARKS ON THE VALUE OF THESE OPERATIONS.—From the variety of circumstances requiring the formation of an artificial pupil, it is impossible for a surgeon to select any one method of operating as preferable to the others, and his choice must, therefore, be decided by the peculiarity of the case. The position of the pupil must also be governed by the opacity of the cornea; but, as a general rule, the most eligible place for it, is as near as possible to the centre of the old one. When it becomes necessary to create a pupil near the circumference of the iris, the nasal is by some deemed preferable to the temporal side, in consequence of its affording more probability of a correspondence with the optic axis of the other eye. Mr. Gibson, of England, with others of extensive experience, object to this, and deem the opening on the temporal side preferable to any other,

¹ Lawrence on the Eye, edited by Hays, Philadelphia, p. 456; also, Bibliography, p. 66.

as permitting a wider field of vision;¹ but here, as in the other questions connected with the operation, the decision must be regulated by the circumstances of the case. The inferior and external portions are less eligible, and the superior is objectionable from being more covered by the eyelids. As illustrative of the peculiar advantages of one mode of operating over the other, the following conditions of the eye may be referred to:—

1st. When the opacity is in the centre of the cornea of one eye, the lens being round, and the iris not prominent anteriorly, and when the other eye is sound, coretomy, or incision of the iris, will be best suited to the case.

2d. Coredialysis, or displacement, is specially adapted to cases of opacity of the cornea, involving a greater portion of its convexity, but where the circumference is clear.

3d. When the capsule of the lens is affected, or the iris is adherent anteriorly or posteriorly, the other operations mentioned may be resorted to.

The extent and importance of the subject will, however, forbid any special recommendation of any operation; and in this, as indeed in most of the affections of the eye, the reader will find it advantageous to consult the works of those who have devoted themselves especially to ophthalmic surgery.

CHAPTER VII.

PLASTIC OPERATIONS ON THE FACE.

THE production of deformities, in consequence of the loss of integument in various parts of the body, but especially about the face, led surgeons, at an early period, to devise some means by which they could remedy the inconvenience and conceal the defect. This result has generally been obtained either by drawing upon the surrounding parts, or by taking flaps from some more distant portion, and modelling them to a proper form, so as to furnish the amount necessary to supply that which was wanting. In all these efforts the success of the operation depended entirely on the produc-

¹ Littell on the Eye, p. 267.

tion of such an amount of inflammation as should result simply in adhesion, whilst, at the same time, sufficient vitality was preserved in the new portion to insure the preservation of its structure. On recalling the position of the surgeons of that period, and the limited amount of knowledge of the effects of inflammation that they possessed as compared with that acquired since the observations of Mr. John Hunter, we cannot but regard their operations as indicating a high degree of skill, as well as illustrative of their close observation of the efforts of nature in healing wounds; and notwithstanding the claims often advanced for the superior character of the surgery of the present day, it may be doubted whether modern operators have ever shown a higher degree of ingenuity and surgical skill than that possessed by those of the period of Taliacotius.

Plastic surgery having originated in the attempt to remedy the deformity arising from the loss of the nose, the detailed account of the different operations may be best given in connection with the section devoted to disorders of that organ; and the following example of the restoration of a portion of integument upon the forehead is therefore presented, at present, merely to preserve the uniformity of arrangement which has heretofore been observed.

SECTION I.

METOPLASTY, OR RESTORATION OF THE INTEGUMENTS ON THE FOREHEAD.

An ingenious application of the principles of plastic surgery to a case in which a large deficiency of the integument on the forehead required to be supplied from the surrounding parts, has been suggested and performed by Dr. John Watson, of New York, and is, it is believed, the first operation of the kind ever practised. The following account is condensed from a paper by Dr. Watson,¹ who has also very politely afforded me an opportunity of having the figures illustrating the case copied from a drawing in his portfolio.

ANAPLASTIC OPERATION FOR A HOLE IN THE FOREHEAD.—A carpenter, æt. 42, was admitted into the New York Hospital in April, 1844, with necrosis of the os frontis of six years' standing,

¹ American Journal of Medical Sciences, vol. viii. p. 537, 1844.

PLATE XVI.

METOPLASTY AND RHINOPLASTY, OR PLASTIC OPERATIONS ON THE FOREHEAD AND NOSE.

Fig. 1. A front view of the Face of a patient, forty-two years of age, who had a large ulcer in the forehead, accompanied with syphilitic caries of the frontal bone previously to being operated on by Dr. John Watson, of the New York City Hospital. The ulcer is represented with thickened and inverted edges, and as retaining a portion of the necrosed bone; a fistulous orifice is also seen at the upper border of each orbit, with another in the left temple, through which pus escaped freely. The eyebrows and upper eyelids are shown as slightly elevated and deformed by the adventitious adhesions existing around these fistulæ. The bone in the centre of the ulcer presents the ordinary characters of caries and necrosis.

Copied from a likeness taken by Dr. Watson.

Fig. 2. Represents the condition of the patient near the termination of the treatment. A linear cicatrix is seen on the forehead, with one or two larger points or depressions in the skin caused by its adhesion to the surface of the bone.

After Watson.

Fig. 3. Represents the line of incision, together with the sutures and lines of union in the wound immediately after the operation.

After Watson.

Fig. 4. Rhinoplasty, as practised according to the Indian method, by Delpech. A triangular, or somewhat V-shaped flap, 1, 2, 3, has been cut upon the forehead, so that the point of the V will correspond with the root of the nose. At 2, an additional portion has been excised with the flap in order to form the column of the nose, and at 4 the flap is seen rotated upon its base, so as to be brought down in front of the nasal cavity. To favor this rotation, and prevent the constriction of the vessels in the flap which would otherwise result, the incision at the base of the flap has been made slightly longer on the right than on the left side of the nose. The numerous sutures requisite for the approximation of the flap to the nose, together with the bougies introduced into the nostril for the support of the alæ, and to preserve the orifices of the nostril, are also represented.

After Bernard and Huetto.

Fig. 5. A side view of the original Taliacotian operation, or that revived by Græfe, with the bandage or jacket worn to support the arm until adhesion occurs in the base of the flap. 1, 2, 3. The flap, cut from the skin of the arm, and attached over the nasal cavity by numerous sutures.

After Bernard and Huetto.

Fig 1



Fig 2

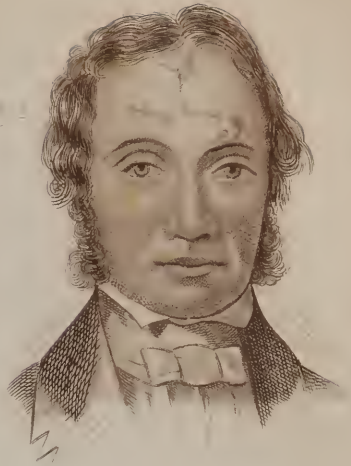


Fig 3



Fig 4

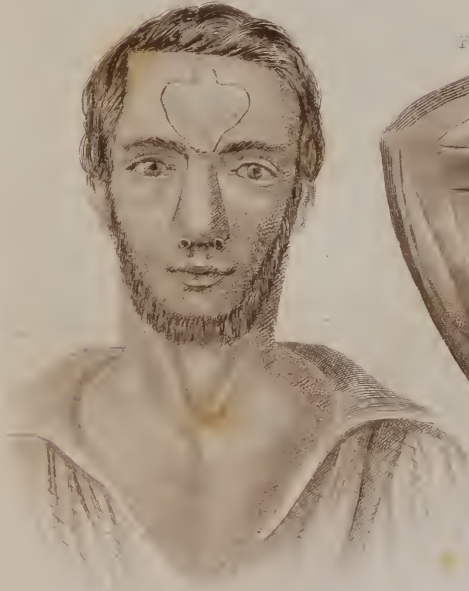
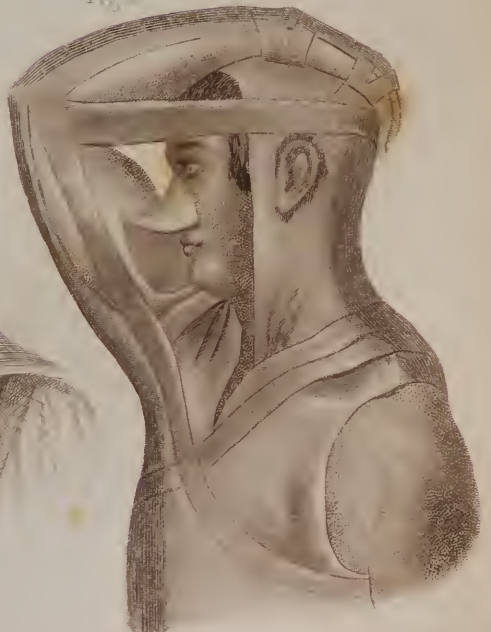


Fig 5



probably the result of syphilis, contracted some twenty years previous, and of which he believed himself cured; the disease on the forehead, according to his own account, having resulted from an injury. At his admission, a large ulcer existed on the forehead (Plate XVI., Fig. 1), exposing a considerable portion of the os frontis, the greater part of the external table of which had already exfoliated, and was held in place merely by the overlapping of the soft parts. A fistulous opening existed at the upper border of each orbit, and another was on the left temple, through which the pus escaped. The upper eyelids were somewhat elevated and deformed by adventitious adhesions around these fistulæ. The exfoliated portion of bone was removed by Dr. J. K. Rodgers, who was obliged to enlarge the opening by a short incision in the scalp at the upper and left angle of the ulcer; the undermined integuments rolled in upon themselves, from want of support, turning a portion of the hairy scalp inwards upon the face of the sore, and adhering in a fold along the left border of the ulcer. (Plate XVI., Fig. 1.)

OPERATION OF DR. WATSON.—After shaving the scalp, and removing the cuticle from the centre of the ulcer, by washing it with concentrated aqua ammoniæ, the integuments along the left border of the ulcer were unfolded by the free use of the scalpel.

The point of the knife was then carried completely around the circumference of the opening, through the whole thickness of the soft parts, so as to remove a strip of integument varying from an eighth to a quarter of an inch in width, thus making a smooth and fresh border for the subsequent adjustment of the flaps.

Two quadrilateral flaps, the one on the left and the other on the right side of the opening in the forehead, were then raised by making four incisions horizontally backwards, and nearly parallel with each other, two on each side, one from each upper, the other from each lower angle of the opening (Plate XVI., Fig. 3), the flaps being detached from the pericranium.

The diseased portions of bone were then removed, as far as they could be detected, by means of the cutting pliers. The largest of these portions was the projecting rim of bone at the left frontal sinus, the removal of which caused a slight depression over the left orbit. The hemorrhage, which had been profuse, was then checked by ligatures.

An attempt was next made to approximate the lateral flaps so as to cover the opening, but this could only be partially accomplished,

as they could be made to meet only to the extent of an inch from their lower edges, even after considerable stretching. The portions thus approximated were secured by sutures, but left a large V-shaped gap in the upper part of the forehead. To close this, a free incision was carried from near the upper and right angle of the ulcer, in a curved direction towards the crown of the head (Plate XVI., Fig. 3); the flap thus made being dissected up and rotated so as to bring its lower and right angle downwards on the centre of the forehead, thus supplying effectually the deformity; the edges being then accurately adjusted by numerous points of sutures (Plate XVI., Fig. 3), strengthened by adhesive plaster, and covered by a compress and bandage. The dressings were subsequently kept wet with cold water. The first dressing was removed on the sixth day, and about three-fourths of the line of incision found to have united by the first intention. At the second dressing, on the ninth or tenth day, cicatrization had progressed somewhat further, and in five weeks the patient left the hospital, at which period the wound had entirely cicatrized, with the exception of a pupillary opening communicating with a small point of earious bone that had been overlooked in the operation, and had not then exfoliated. Plate XVI., Fig. 2, represents the patient as cured.

CHAPTER VIII.

OF THE EXTERNAL NOSE.

SECTION I.

ANATOMY OF THE EXTERNAL NOSE.

THE general relations of the nose to the surrounding parts are so well known that reference to them in detail is deemed unnecessary. The structure of the nose, proceeding from the outside to the cavity of the nostril, is composed of the skin, cartilages, bones, and mucous membrane.

The skin on the upper portion, or root of the nose, is similar to that on the forehead, is loosely attached to the subjacent parts by

a free cellular tissue, and is, therefore, very movable. At the point and lower half of the nose, or sides of the nostril, it is abundantly furnished with sebaceous follicles, and is attached to the cartilages by short fibrous filaments which render it very immovable and difficult to dissect from the subjacent parts, without injuring them. These follicles are generally the seat of the lipomatous tumors found in this region. When they attain such a size as to demand extirpation, it may be accomplished by dissecting them off from the base, taking care not to cut through the cartilages. The wound may be subsequently closed by sutures and adhesive strips; or, if very extensive, as is sometimes the case, be left to heal by granulation and cicatrization.

The cartilaginous portion of the nose is formed by a vertical cartilage or septum, placed in the middle line of the nose, continuously with the bony septum formed by the vomer and nasal lamella of the ethmoid bone, and of the oval cartilages or oblong oval plates, which, forming the structure at the point, are directed upwards and backwards from the cartilaginous septum. The contact of the oval cartilages with each other forms the *columna nasi*.

The *alæ nasi*, or convexities on the sides of the nostrils, owe their shape to several small cartilages, united by ligamentous matter. They keep the nostril patulous, and also permit its free motion.

The mucous membrane covers these cartilages as well as the bones of the internal nose.

SECTION II.

OPERATIONS UPON THE EXTERNAL NOSE.

The operations practised upon the external portion of the nose may be demanded either for the removal of lipomatous tumors, for occlusion of the nostril as the result of ulceration or burns, or for the cure of deformities arising from loss of substance.

The class of tumors usually known as Lipomatous, and described as such, or as carcinomatous, are occasionally seen on the lower extremity of the nose. These tumors have been very indefinitely described by European writers, who have sometimes merely referred to them as "an increase in the thickness of the skin, which some-

times becomes a prominent swelling,"¹ or as "a hypertrophied condition of the integuments and subcutaneous adipose tissue."² The soundest view of their pathology will, therefore, it is thought, be found in a paper on Polypi and other Tumors of the Nose, by Dr. John Watson, of New York, who regards them as neither carcinomatous nor lipomatous, but as dependent on a hypertrophy of the integuments and cellular tissue, attended with sero-fibrinous infiltration and with excessive development of the sebaceous cryptæ proper to the integuments. He also regards them as mainly dependent on enlargement of the sebaceous crypts of the nose, being in fact analogous to the polypous growth. They are slowly developed, unattended with pain, and occur either singly or in groups; are disposed to assume a pyriform shape, to become pendulous, and to grow to an enormous size, reaching, in some instances, to the lower lip, and in others below the base of the chin.³ Their development is often a strictly local complaint, being limited to the skin; does not involve the nasal cartilages; and, though vascular, and disposed to bleed freely, they may be removed by shaving or dissecting them off from the cartilages, care being taken previously to introduce a finger into the nostril so as to prevent the injury of the alæ by the incisions, the ulcer, when large, being allowed to heal by the second intention.

The relief of the contraction of the nostrils resulting from lupus, scrofulous ulcers, or burns, requires the formation of an opening by paring away the tissue around the nasal orifice, and an endeavor to heal the ulcer by the use of nitrate of silver. The production of the opening is sufficiently easy, but its preservation, even with a free excision of the surface of the alæ, is often very difficult, cicatrization and subsequent contraction often closing it as soon as the tubes or tentes are removed.

In a young lady, in whom both nostrils were completely closed, as the result of scrofulous ulceration, the mucous membrane was perfectly sound, and its secretion free enough to escape by the posterior nares; yet, notwithstanding free excision, the use of sponge tentes, caustic, &c., I failed to effect a restoration of the passage.

¹ Ferguson, p. 426, 2d edit. Philada. 1853.

² Miller's Practice, p. 162, 3d edit. Philada. 1853.

³ Am. Journ. of Med. Sciences, April, 1842, p. 345.

SECTION III.

RHINOPLASTY.

The restoration of the whole or of part of the nose constitutes a variety of the class of plastic operations designated as Rhinoplasty. These operations are among the most tedious and painful in surgery, and, before undertaking them, the surgeon will find it advantageous to resort to the following preliminary measures: 1st, make the patient fully aware of what it is necessary to suffer; 2d, inform him of the chances of failure from want of vitality in the new portion; 3d, of the great tendency to contraction in the new organ; 4th, of the probable difference in color and texture between it and the nose in its natural condition. When the result is fully understood by the patient, the surgeon should proceed to study most thoroughly the probable shape and natural characters of the lost part; make ample calculation for the shrinking of the flap, allowing, generally, for the ultimate loss of at least two-thirds of the portion at first taken; and, cutting pieces of thick, or moderately stiff paper, or, what is better, kid or soft leather, fit them to the part, or mould a wax nose upon the deficient portion, and, by flattening it, endeavor to obtain an accurate pattern of the shape of the integuments that will be required, marking it upon the skin that is to furnish the new structure by means of lunar caustic. In addition to this, let him also prepare his patient most carefully by an appropriate general treatment, and select such a period and locality as will be most likely to ward off an attack of erysipelas. In operating for the restoration of a nose where the bones and cartilages are all destroyed, he should also make his patient comprehend that, as the bridge has been destroyed, the new nose will never present the convexity of the old one, but that, though thus defective, it may yet look better, and render him more comfortable than he was before the operation.

The various modes of performing plastic operations, have been arranged under three classes: 1st, the Indian method, or original plan of the Brahmins, in which the flap is taken from the integuments of the forehead; 2d, the Italian or Taliacotian operation, where the flap is taken from an extremity, usually the arm, near the insertion of the deltoid muscle, several days before it is applied to the deficient portion; 3d, where it is taken from the forearm;

PLATE XVII.

RHINOPLASTIC AND CHEILOPLASTIC OPERATIONS.

Fig. 1. Appearance of John Glover prior to the operations of Cheiloplasty and Rhinoplasty, as performed by Dr. Pancoast, of Philadelphia.

After Pancoast.

Fig. 2. View of his face with the chin depressed. The mouth being contracted into a rigid orifice, was enlarged laterally by the "stomatoplastic operation of Dieffenbach for atresia oris, after which two flaps were formed, as marked in the lines upon the cheeks, so as to form the upper lip.

After Pancoast.

Fig. 3. Appearance of his face after this operation, showing the position of the sutures and the improvement in the mouth.

After Pancoast.

Fig. 4. Shows the steps of the Rhinoplastic operation performed upon him subsequently. The edges of the nasal cavity being freshened by a grooved incision, the outline of the new nose was marked on the forehead before cutting the flap. The dots indicate the position of the sutures.

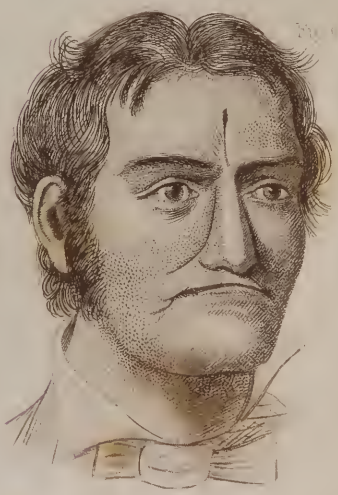
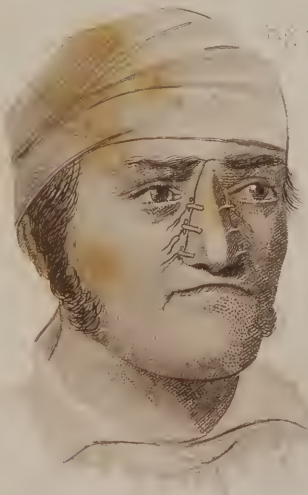
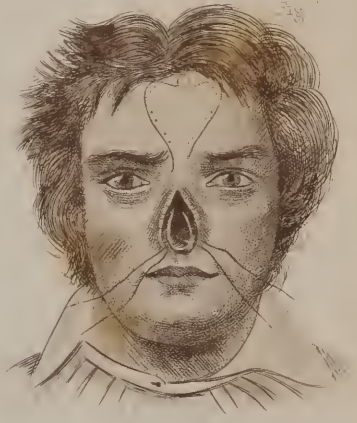
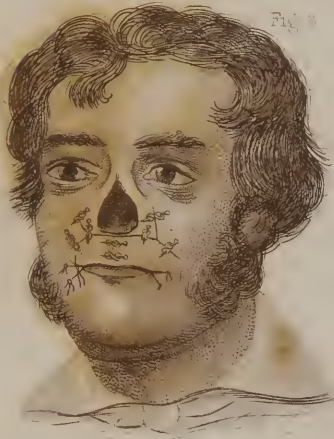
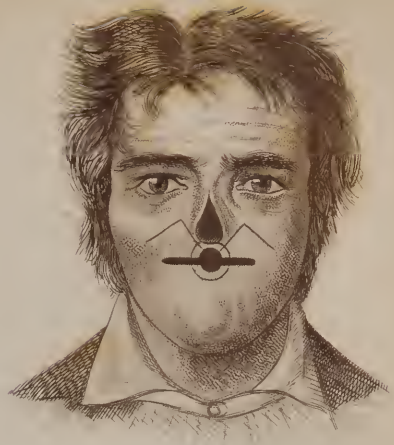
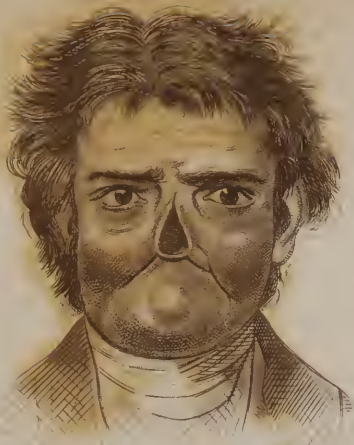
After Pancoast.

Fig. 5. The wound in the forehead being closed by the hare-lip sutures, the flap was reverted, and attached in the groove on the edge of the nasal cavity by three stitches of the interrupted suture, which were tied over little rolls of adhesive plaster, after Græfe's method. The edge of the septum is also attached to the upper lip. The twist in the pedicle is seen in the root of the nose.

After Pancoast.

Fig. 6. An accurate likeness of John Glover, sixteen months after the operation.

After Pancoast.



with some modifications, as practised by Græfe and others among the Germans; and 4th, the French plan, in which a piece taken from the neighboring parts is slid over or rotated so as to cover the deficient portion.

To these may be added the insertion of a piece directly removed from some other portion of the body, and attached to the deficient part.

Plastic surgery, as illustrated by the plastic operations practised on the Face, dates from a very early period, having been long practised in India in order to remedy the losses occasioned by the punishment of criminals, whence the origin of the Brahmin method of operating. In 1597, Taliacotius, of Venice, whose attention had been largely devoted to the relief of these deformities, operated by taking a flap from a distant part, and applying it to the part which was to be restored, subsequently freeing it from its stem, when it had united. Having published a volume on the subject, in which he detailed his methods of operating, the term Taliacotian has since been often employed to designate all plastic operations, though it should be strictly limited to his or Branca's peculiar plans. Græfe, of Germany, modified this method in 1815, resorting to immediate union of the flap; whilst Labat, Serre, and others, in France, in 1834, published long accounts of their success by means of flaps taken from adjoining parts. In the United States, the Taliacotian operation had nearly fallen into oblivion, when it was successfully revived, in 1837, by Dr. J. Mason Warren, of Boston, who modified the operation of Græfe by taking the flap directly from the forearm instead of the arm. Since then, rhinoplasty in different forms has been frequently resorted to with varying success, by Drs. Joseph Pancoast and Thomas D. Mütter, of Philadelphia; and the original Taliacotian operation for restoration of the end of the nose has since been performed by Dr. Horner, of the same city, but without success, owing to the sloughing of the edges of the flap. In nine cases operated on by Dr. Pancoast, of Philadelphia, and united with what he terms the "plastic suture" (p. 331), the parts uniformly united by the first intention; the operator attributes his marked success mainly to the use of this excellent suture.¹

As the Brahmin method is preferable to that of Taliacotius, when the forehead is capable of furnishing the flap, I mention it first.

¹ Med. Examiner, vol. viii. N. S. p. 344, 1852.

§ 1.—INDIAN OR BRAHMIN METHOD OF RHINOPLASTY.

OPERATION OF DR. J. MASON WARREN, OF BOSTON.—“The patient, a young man, aged 28 years, had lost, from ulceration, the whole nose, cartilages, septum, and bones. In the place of the nose there existed an opening, about one inch in diameter, bordered by a firm cicatrix; and, the septum being destroyed, the cavities of the two nostrils were thrown into one. The four front teeth with the alveolar processes had also been lost, and there was an opening between the lip and the upper jaw through which a probe might be passed from the mouth into the nasal cavity. The favorable circumstances connected with the case were the healthy state of the integuments surrounding the opening of the nasal fossa, the great height of the forehead, the whiteness and delicacy of the skin, and the good state of the patient's health.

“OPERATION, Sept. 7th, 1837.—A piece of pasteboard, cut in the shape of the letter V, that is, triangular, and with a projection from its base, corresponding with the columna of the nose, was placed upon the forehead, and a trace made around it with the nitrate of silver, as recommended by Lisfranc, in order that it might not be effaced by the blood. A trace was also made around the opening of the nasal fossa, at the points where it would be necessary to remove the integuments for planting the new skin taken from the forehead. This was done the night previous to the operation. The clothing being arranged, the patient was laid on a table with his face towards the window and the operator behind him, so as to have the full command of the head. The traces made by the nitrate of silver were about two-thirds of an inch apart between the eyebrows; each side of the triangular portion of the skin was three inches and a quarter in length, with a base of three and a half inches, and the projection from the columna of the nose, which was to be taken entirely from the scalp, previously shaved, was an inch and a half long, and two-thirds of an inch wide.

“The head being firmly supported by two assistants, the incision was commenced between the eyebrows and the flap of skin dissected up so as to isolate it entirely from the skin of the forehead, except where, for the purpose of nutrition, it was left adherent at the root of the nose. The incision on the left side, between the eyebrows, was extended a little further down than on the right, the better to

facilitate the twisting of the flap. This incision included the skin, subcutaneous cellular tissue, and a portion of the occipito-frontalis muscle, care being taken not to raise the periosteum from fear of necrosis. The flap, thus dissected and twisted round to the left side, was carefully wrapped in a compress of linen cloth, and before the operation was proceeded in further, attention was given to diminishing the large wound made in the scalp (forehead) (Plate XVI., Fig. 4); little hemorrhage had taken place, and the temporal arteries which had been cut very soon retracted and ceased bleeding. The angles of the wound were now brought together by the twisted suture, two pins being employed on either side. Its edges between the eyebrows were also approximated in a similar manner, and by this means the wound in the forehead was at once diminished to less than half its original size; it was still further reduced by the use of a few strips of adhesive plaster; and a little scraped lint filled up the remainder of the wound. Some spread cerate was placed over the whole surface with a pledget, and the dressing was secured by a bandage round the head.

"The next object was to fasten the borrowed skin in its place. In order to do this, it was necessary to freshen the borders of the opening in the nasal fossa, the traces of which, as stated, had been previously made with the nitrate of silver. For this purpose, a short, narrow knife, somewhat similar to a cataract-knife, was used (resembling the original knife of Taliacotius), and a strip of integument a third of an inch broad, including all that had been indurated in the old cicatrix, removed. The knife was also passed between the lip and upper jaw, in which existed, as before stated, an opening large enough to pass a probe, and the adhesions between the two for the space of an inch entirely cut away, for the double purpose of giving the columna of the nose a more deep and firm adhesion, as well as to close up by inflammation the unnatural communication between the mouth and nasal cavity.

"The flap was now brought down into its place, its angles a little rounded with the scissors, the better to simulate the *alæ* of the nose, and the whole secured in its place by pins and points of the interrupted suture." In a subsequent operation, the interrupted suture was used, and is generally preferable.

"From that portion of the skin which was to form the columna, the epidermic side was pared a little, so that it might form an adhe-

sion, not only underneath to the jaw, but on its sides to the quadrangular wound made for it in the upper lip.

"A little scraped lint was now placed under the ends of the pins, and a strip of oiled lint introduced into each nostril to prevent adhesion; another strip was placed upon the nose to preserve its temperature, and the dressings were confined by a band of adhesive plaster fixed to the forehead above and partially divided in the middle, so that it might descend on each side of the nose to the lip."¹

A double T bandage, made of narrow tape, the horizontal portion of which is applied to the upper lip, and the two vertical portions carried over the root of the nose, will also serve a good purpose and be free from the objections to the use of adhesive plaster.²

OPERATION OF DR. J. PANCOAST, OF PHILADELPHIA.³—After marking out the flap, as described in the preceding operation, Dr. Pancoast prefers to cut out a second model in adhesive plaster and fit it into the space just marked out on the forehead by placing its apex perpendicularly between the eyebrows; or, if the forehead is low, to place it in an oblique instead of a vertical direction, so as to avoid cutting into the hairy portion of the scalp. After thus delineating the flap on the forehead, the points for the sutures, and their corresponding places on the sides of the nasal opening, should be dotted with ink or colored varnish (Plate XVII., Fig. 4), so as to insure the accurate adjustment of the flap to the nose. The peduncle of the flap at the root of the nose should also be calculated so as to leave it from a half to five-eighths of an inch wide, in order to permit the rotation, and also preserve the nourishment of the flap by one or both of the angular arteries of the nose.

The first step, now, consists in freshening the edges of the stump of the nose, so as to leave a groove for the reception of the flap, the nostrils having been previously filled by lint so as to prevent the blood flowing back into the throat.

The second is the dissection of the flap from the forehead and the closing of the wound (made by its removal) with twisted sutures, compress, &c.

In the third step, the flap is brought down to its place and retained there by the following suture, to which the operator attri-

¹ Boston Med. and Surg. Journ., vol. xvi. p. 69, 1837.

² See Smith's Minor Surgery.

³ Operative Surgery, 3d edit. p. 350, *et supra*, 1852.

butes much of the happy results that have attended his nine operations, all of which united by the first intention. This suture he forms in the following manner:—

PANCOAST'S PLASTIC SUTURE.—Three waxed silken ligatures, armed with a needle at each end, are to be placed in the groove at each side of the nostril, by passing one needle from without inwards through the inner wall of the groove, and then from within outwards, at a point about one-eighth of an inch above its first puncture, so as to leave this needle and that attached to the opposite end of the same ligature, resting on the cheek, the loop on the inner side of the groove being thus made to embrace about one-eighth of an inch of its inner surface (Plate XVII., Fig. 4). Then, when the edge of the flap is adjusted to the groove, the two needles are to be passed through the margin of the flap from within outwards, so that, when drawn tight, the ligature will necessarily sink the edge of the flap to the bottom of the groove, and bring the upper and under surface of the edge of the flap in contact with the outer and inner edge of the groove, and thus facilitate the union; after which the ligatures are all to be tied over small rolls of adhesive plaster, after the manner of Græfe and Labat, so as not to strangulate the parts included in the loop (Plate XVII., Fig. 5). After applying greased lint internally and externally, the warm-water dressing was continued on the nose, and the pedicle near the forehead not divided for five or eight weeks.

REMARKS.—In the performance of these operations, great attention should be given to the following points:—

1st. To mould a good nose (in soft wax) to the nasal cavity, and then flatten it out, in order that it may serve for a model.

2d. To obtain a sufficiently large and full flap from the forehead, of the shape, but not the size of the model, as it is almost impossible to anticipate the amount of the subsequent contraction of the new covering of the nose.

3d. To dissect up all the integuments of the forehead above the periosteum, the latter being left untouched.

4th. To make a good groove on the sides of the nostril, and bevel the edges of the flap, so as to fit it accurately.

5th. To unite the edge of the flap to the sides of the groove by Pancoast's *plastic suture*.

6th. To unite the column of the new nose to the gum, and to

bevel its edges so as to prevent their union with the margins of the flap which form the *alæ* of the nostril.

7th. To guard against contraction of the orifices of the nostrils, or their union with the septum, either by the use of rolls of greased linen, by the introduction of a piece of catheter, or by bevelling off the edge of the *alæ*, and turning it into the nostril so as to form a sort of hem to the edge of the orifices, as suggested by Labat.

8th. If the nasal orifices contract, then to pare them off and treat the surface with nitrate of silver until healed, taking care to distend the opening during the process.

The greatest care in nursing is also essential, especially for the first few days, lest the patient should, by any inconsiderate movement, disturb the flap before union has occurred.

The following operation is another example of the variety seen in these plastic operations:—

CHEILOPLASTY AND RHINOPLASTY.—OPERATION OF DR. J. PANCOAST, OF PHILADELPHIA.—A man, aged fifty-three, had lost all the soft parts of the nose and whole of the upper lip, from the commissures of the mouth to the canine fossa of each side, as well as the septum narium and the turbinated bones, the cavities of the antrum Highmorianum and of the sphenoidal sinuses being exposed. His appearance, with his mouth closed, is shown (Plate XVII., Fig. 1). The mouth, when opened, presented a rigid circular orifice three-fourths of an inch in diameter.

OPERATION.—The mouth was widened after Dieffenbach's method (Plate XX., Fig. 7), after which the free surface of the gum was freshened. An incision was then made obliquely upwards and outwards for a quarter of an inch from the point where the gum was covered by integuments, and from the end of this another cut was made for about the same distance, nearly parallel with the incisions for widening the mouth, but inclined a little downwards. The cheeks being now loosened from the gum and malar bone by incisions on the side of the mouth, the flap of skin and subcutaneous fatty matter was raised from the surface of the muscle by beginning the dissection at the angle next the nose (Plate XVII., Fig. 2).

The arterial branches, which were divided, having been twisted, the flaps were drawn downwards and forwards over the raw surface of the gum and fastened together with the hare-lip suture (Plate XVII., Fig. 3), the inner edge of the rotated flaps being thus united in the middle line of the lip. The face being then dressed

with lint wet with lead-water and laudanum, the patient recovered in about two months. The nose was subsequently formed as follows:—

The hair being shaved from the temple and forehead, the nasal orifices closed with lint to prevent the entrance of blood, and the patient lying down with the head supported by a pillow, a flap was raised from the forehead, as shown in Plate XVII., Fig. 4, the skin being divided at a single sweep of the knife, the blade of which was inclined outwards so as to cut a bevelled edge. The apex of the flap, which was about five-eighths of an inch wide, rested between the eyebrows, and the tongue-like portion which was to form the *columna nasi*, extended up into the scalp. The base of the flap was nearly three inches wide, in order to allow for its subsequent contraction. The flap, after being dissected up, was then turned down on the left side and wrapped in linen, whilst the wound in the forehead was closed by four interrupted sutures, after which the flap was applied to the freshened edges of the new lip and gums, the whole being held in position by the plastic suture before described, and tied over rolls of adhesive plaster as in Græfe's method (Plate XVII., Fig. 5). Union having occurred, the pedicle of the flap was divided five weeks subsequently, by passing a director under it, after which it was smoothly fitted down to the roots of the *ossa nasi*, in a cavity which was made for its reception by excising a portion of the subjacent integuments. By the twelfth day, union was perfect, and the patient left the hospital so much improved that, sixteen months subsequently, his likeness was taken, as represented on Plate XVII., Fig. 6.

REMARKS.—This very fortunate case, though forcibly illustrating the skill and dexterity of the accomplished operator, can only be regarded as an example of the fortunate cases, and though it may stimulate others to repeat it, should not induce any surgeon to be sanguine in his general prognosis of this class of operations.

§ 2.—TALIACOTIAN OPERATION.

OPERATION.—In the Italian or Taliacotian operation, as it is more frequently termed, the nose, upper and lower lips, or ear, have all been restored by means of flaps taken from other portions of the body, and especially from the integuments of the arm.

In operating for the restoration of a nose, Taliacotius made two parallel incisions in the integuments of the arm over the belly of the biceps muscle, at such distances from each other, and of such lengths as seemed likely to furnish a sufficient flap, allowance being made for the subsequent shrinking of about two-thirds of the portion taken, cutting it so as to free the skin from the fascia. The incisions corresponded with the vertical portions of the letter **H**; or he elevated the skin by broad forceps, and then transfixed it, as in the ordinary introduction of a seton in the neck. In either case, after passing the knife beneath the skin from one incision to the other, he introduced a piece of linen spread with cerate in order to prevent adhesions between the flap and the subjacent parts, and allowed the wound to suppurate for ten or fifteen days, in consequence of which a contraction of the width of the flap was effected, whilst it was also thickened and rendered more organizable. A bandage, consisting of a jacket, with a hood for the head, and a sleeve to contain and support the arm (Plate XVI., Fig. 5), with bands to hold it fast to the head, so that the flap could be steadily kept attached to the nose, being next prepared, the edges of the surface to be restored were freshened by paring off the cicatrix, by means of a thin and broad-bladed knife, the flap freed from the arm by its upper extremity, the arm brought up to the head, and the fresh end of the flap attached to the raw surface of the nose by means of numerous points of the interrupted suture; after which the bandage was tightened, and the arm left attached to the head (Plate XVI., Fig. 5).

After fifteen or more days, when union had taken place, the attachment of the flap to the arm was divided and trimmed so as to fill up the remainder of the deficient portion, this end being retained in its position by a few turns of a bandage, passed from the head around the nose, lip, or ear, according to the part operated on.¹

REMARKS.—This operation, though applicable to all parts of the face, is especially adapted to the restoration of the tip of the nose, the loss of portions of the lips and ears being more readily supplied by flaps taken from the adjacent parts by either sliding or rotating them upon their base.

¹ Gasparis Taliacotii Borroniensis. De Curtorum Chirurgiæ per insitionem, additi cutis traducis, instrumentorum omnium atque deligationum iconibus et laterillis. Venetiis, 1597. This book, together with many other rare and ancient medical works, may be found in the Loganian portion of the Philadelphia Library.

With some slight modifications, the Taliacotian operation was successfully performed by Dr. J. Mason Warren, of Boston, in April 1840.¹ In this case, the flap separated from the arm on the fifth day, union having then occurred.

By a modification of the French method, Dr. J. PANCOAST, of Philadelphia, has also succeeded in restoring the middle of the nose, together with the ala of the left side. In this case, a great portion of the hard palate, the sockets of the upper incisor teeth, the cartilaginous septum, superior lateral cartilages, inferior turbinated bones, together with a considerable portion of the inferior oval cartilages, and the integuments of the nose, had been destroyed by scrofulous ulceration, the tip and margin being drawn upwards and also depressed inwards by the cicatrization (Plate XVIII., Fig. 3).

PANCOAST'S OPERATION.—The patient being laid on a table with his head supported by pillows, the integuments of the depressed cicatrix, just below the ossa nasi, were dissected off so as to obtain a bevelled raw surface, to receive the margins of the flaps, and the end of the nose separated from the ossa nasi by pushing a sharp-pointed, straight bistoury, with the back to the cheeks, across the cicatrix, and cutting outwards. It was also found necessary to divide some adventitious adhesions within the nostril, and to extend the incision of the cheek outwards and downwards through the root of the oval cartilages, before the tendency to retraction of the tip could be overcome.

A triangular flap of integuments being then marked out on each cheek just below the malar protuberance, of a size calculated to fill the breach, the outer limb of each triangle was rounded so as to give a prominence to the ridge of the nose, when the base of the flaps were brought together, and the edges of the flaps bevelled inwards towards their centre, so as to furnish an oblique surface, by which they might rest in the raw edges of the nose (Plate XVIII., Fig. 4). Being dissected up with as much subcutaneous cellular substance as could be taken without involving muscular fibres, the hemorrhage was arrested by torsion, and the flaps twisted upon the pedicle, from below upwards, so as to make the lower margin of the flap on the cheek become the upper on the nose.

The flaps were then united by their bases upon the dorsum of the nose, and by their sides to the adjoining parts (Plate XVIII.,

¹ Boston Med. and Surg. Journ., vol. xxii. p. 261.

PLATE XVIII.

RHINOPLASTIC OPERATIONS.

Fig. 1. Restoration of one-half of the Nose and part of the Cheek by a flap taken from the Forehead by Dr. Pancoast. Seen as adjusted.

After Pancoast.

Fig. 2. Side view of the same with the Flap in *situ*, showing the arrangement of the sutures upon the cheek.

After Pancoast.

Fig. 3. Likeness of a Patient operated on by Dr. Pancoast, of Philadelphia, for the removal of a Deformity caused by the destruction of the hard Palate, Septum Narium, and all the soft parts of the Nose, with the exception of the lip and columna, these being distorted and fastened to the lower end of the ossa nasi.

After Pancoast.

Fig. 4. A view of the Gap left in the Nose of Fig. 3, after the dissection of the cicatrix and depression of the tip of the nose. The outlines of the flaps cut from the cheeks to fill up the gap are also shown.

After Pancoast.

Fig. 5. A side view of the same, showing the application of the Sutures and the closure of the wounds left in the formation of the flaps.

After Pancoast.

Fig. 6. A front view of the same, showing the arrangement of the Twisted Sutures to both the nose and the wounds left in the cheeks.

After Pancoast.

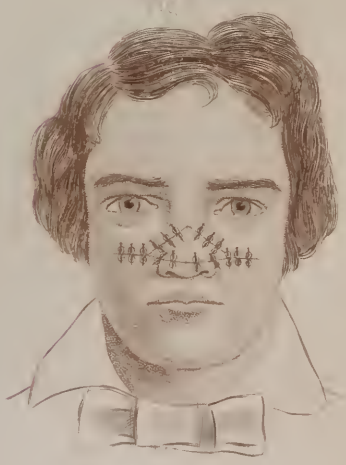
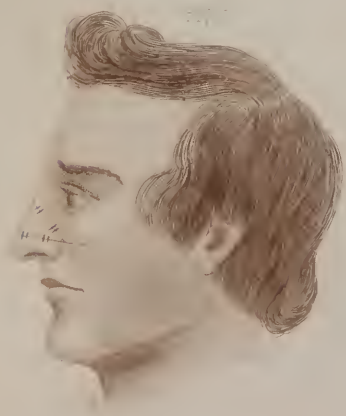
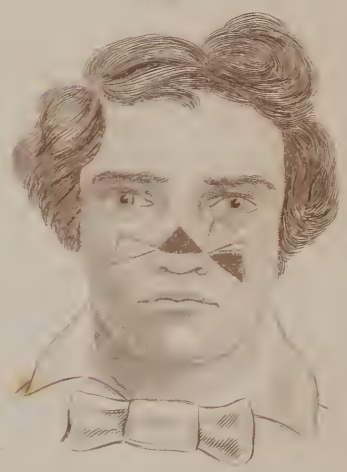
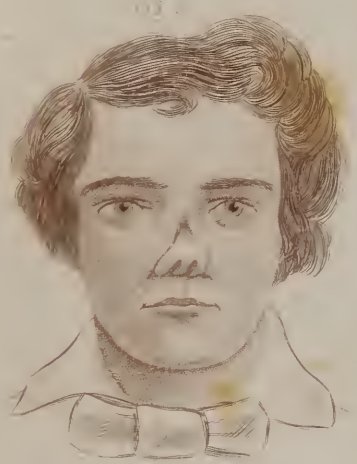
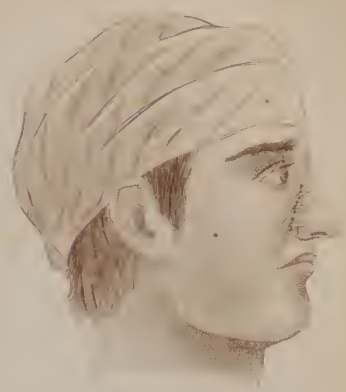
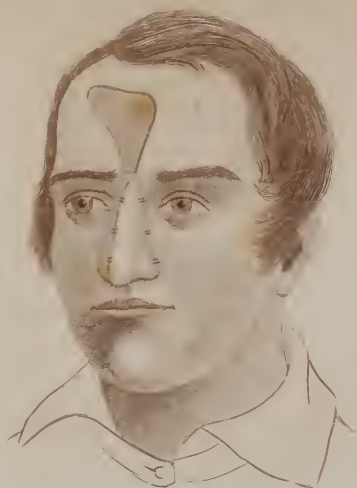


Fig. 6), by small palladium pins and the twisted suture. The nostrils were lightly stuffed with oiled lint, and the wounds on the cheek united by harelip sutures, applied so that the stress should be towards the canthus of the eye, and not upon the middle of the eyelid, which might have caused ectropion, when lint, wet with warm water, and covered with oiled silk, completed the dressing. At the first change of dressing, complete union was found to have taken place everywhere except at the median line, where there was some suppuration.

After some further additions to remedy defects arising from ulceration and contraction, the nose, ten months after the operation, looked quite natural. In his subsequent operations, Dr. Pancoast employed the *plastic suture* instead of the twisted, as he has found it preferable to most of the others.¹

RESTORATION OF THE ALÆ NASI may be accomplished either by a half flap of the Indian method, by the Taliacotian operation, or, if the loss is very limited, by a piece taken from some other part, and immediately attached in the opening, an operation which has fully succeeded in the hands of J. Mason Warren, of Boston.²

§ 3.—RESTORATION OF THE COLUMNA NASI.

LISTON'S OPERATION.—In deficiency of the columna nasi, the late Mr. Liston took the flap from the upper lip in the following manner. The point of the nose being raised, and its apex freshened at its attachment, by two vertical incisions on each side of the centre of the lip, he cut a flap of the entire thickness of the part, wide enough to allow of shrinking, when the frænum being freely dissected off, the flap was everted upwards, so that its mucous membrane presented outwardly. Then removing the membrane from the top of the flap, the latter was attached by a pin, through its end, to the apex of the nose, and fastened by the twisted suture, uniting the lip as in the harelip operation. Exposure to the air soon changed the mucous membrane, and after a time it resembled the original structure of the columna.³

¹ Pancoast's Operative Surgery, Philad. 1844, p. 350, and Amer. Journ. Med. Sciences, vol. iv. p. 337, New Series, 1842.

² Boston Med. and Surg. Journ., vol. xxii. p. 268, 1840.

³ Liston's and Mütter's Surgery, p. 168, Philad. 1846.

For many other plastic operations, and for much valuable experience, the reader may advantageously consult the papers of Drs. Warren, Pancoast, and Mütter, as quoted in the Bibliography, all of which contain drawings explanatory of the various steps in the operations, and are creditable specimens of the ingenuity of these surgeons in relieving shocking deformities.

VALUE OF THESE OPERATIONS.—In estimating the value of Rhinoplastic operations generally, and especially that for the restoration of the entire nose, much must depend upon the nature of the deformity. Most frequently, or when the operation is at all proper, the deficiency will be very great, and under such circumstances even an imperfect-looking nose will be deemed by most patients better than none. But, when it is remembered that the integument of the new organ will retain most of the ordinary appearances of skin, whilst that of the natural nose possesses a large number of follicles; that the hair upon the flap is apt to grow and require the frequent use of the tweezers for its extraction; that the new nose will generally be paler than the surrounding skin, and that, except in the Taliacotian operation, a cicatrix of some size will be visible at the part from which the flap has been taken, the surgeon may well hesitate and think whether, with the risk of failure or an imperfect success, it may not be better to import from Paris, or elsewhere, an artificial nose, the manufacture of which has now attained considerable perfection. If, on its reception, the patient's vanity is not gratified, the operation may be then undertaken with less chance of censure, should the result not entirely correspond with his or her anticipations. In the successful cases, which are those mainly reported, there is certainly great cause for satisfaction, and especially in those reported by Drs. Pancoast, Mason Warren, and Mütter; but, as this class of operations has been at different periods lauded highly, and then fallen into disrepute, is it not probable that the number of failures, or abortive attempts, will again throw it into comparative oblivion? Plastic operations for the restoration of small deficiencies have been and are positive triumphs of science; but that for the restoration of an entire nose is by no means so well established, notwithstanding the *éclat* attached to the successful cases; at least, those which have been seen by the author have not presented captivating specimens of the nasal organ.

CHAPTER IX.

OF THE INTERNAL NOSE, OR THE NASAL CAVITIES.

SECTION I.

ANATOMY.

THE internal nose consists of two large fossæ in the middle of the superior maxillary bones, which present a very irregular surface. These fossæ, or cavities, are separated by the vertical septum, which, in the natural condition of the part, is a plane surface, and corresponds with the inner side of the nostril. The upper part of each fossa is formed by the cribriform plate of the ethmoid bone, the cells of which diminish very much the width of this portion of the cavity, so that the space between the upper and middle turbinated bones and the septum narium is frequently not more than three lines.

The bottom or floor of the nostril is formed by the palate process of the superior maxillary and palate bones, and is concave and about half an inch wide.

The external face is very irregular, presenting a number of convexities or prominences (Plate XIX., Fig. 1), which are intended to afford a greater surface for the lining or olfactory membrane. Among these prominences, that caused by the convexity of the inferior turbinated bones is very apparent, and tends much to diminish the breadth of the nostril throughout its whole depth. The middle meatus of the nose, or the space between the middle and inferior turbinated bones, contains the orifice of the antrum Highmorianum. This orifice is usually situated about the middle of the bone, but its precise situation and direction are so uncertain that it is stated, by an accurate anatomist,¹ to be found with some difficulty in the subject, though quite apparent in the skull.

The inferior meatus of the nose is between the lower turbinated

¹ Special Anat. and Histology, by Wm. E. Horner, M. D., vol. ii. Phila. 1851.

bone and the floor of the nostril. At the anterior part of this meatus, about five lines from the anterior extremity of the turbinated bone, is the orifice of the ductus ad nasum.

This orifice is found at the upper part of the inferior meatus, about eight lines from the floor of the nostril.

The mucous membrane lines the whole nose, penetrates into the several sinuses and cavities communicating with it, and is continuous at the nostrils with the skin, and at the posterior nares with the lining membrane of the pharynx.

The posterior orifice of the nostrils, or the posterior nares, is divided, like the anterior, by a vertical septum (vomer). Its perpendicular diameter is about an inch, but its transverse diameter is only six lines (Velpeau), points which should be remembered in the introduction of the tampon for the arrest of epistaxis.

SECTION II.

OPERATION ON THE NASAL CAVITIES.

REMOVAL OF FOREIGN BODIES.—The introduction of beans, beads, grains of coffee, cherry-stones, ribbon, &c., into the nostrils of children, sometimes gives rise to considerable trouble in their extraction, especially when the article is one capable of swelling from heat and moisture. In every instance, however, it is desirable to attempt it at as early a period as possible, in order to avoid the turgescence and serous infiltration of the lining membrane of the nose.

Unless of considerable size, these bodies are seldom arrested upon the floor of the nostril; more frequently they will be found between the inferior or middle turbinated bones and the septum; and, in attempting their removal from this position, the delicacy of these bones should be borne in mind.

A piece of annealed wire, covered with thread, such as is used by the milliners in the manufacture of ladies' bonnets, and formed into a loop, will often prove a simple and efficient instrument for the removal of the substance, when there is but a small space at its side through which to pass an instrument.

Foreign bodies may be extracted either from the front of the nostril or pushed back into the throat, according to their proximity

to one or other of these orifices. As they seldom fill up the entire front of the nose, a curette or curved probe, or Leroy's instrument for removing fragments of calculi from the urethra, may generally be passed on one side of the article, so as to enable the operator to draw it forward. If jammed between the inferior turbinated bone and the septum, gentle pressure from above downwards, by placing it upon the floor of the nostril, will facilitate its subsequent removal either by the instruments before named, or by polypus or common dressing forceps. If, however, the foreign substance should be a piece of ribbon, or something similar, which has been stuffed high up in the cavity, washing out the nostril by a stream of water from a syringe, will often dislodge one end and enable the operator to seize and draw it out with his forceps.

§ 1.—ARREST OF HEMORRHAGE FROM THE NOSTRIL.

Bleeding from the nostril, when excessive, and when the use of powdered galls or tannic acid, or matico, or gum Arabic, or alum, has failed, may usually be arrested by plugging up both the anterior and posterior extremities of the nostrils, so as to prevent the escape of the blood, and cause the formation of a clot.

PLUGGING THE NOSTRIL WITH BELLOCQUE'S INSTRUMENT.—This instrument (see Plate XIII., Figs. 25, 26) consists of a curved silver tube, in which is placed a piece of watch-spring of sufficient length to reach from the uvula to near the front teeth. To one end of this spring is attached a silver button, with an eye capable of readily receiving a ligature; to the other is screwed a probe, which is intended to push out the spring.

OPERATION.—After preparing a little pellet of charpie, of a size corresponding with the opening in the posterior nares, and after passing a long ligature through the eye of the button at the end of the spring, and drawing the latter fully within the canula, pass the tube along the floor of the nostril, keeping it close to the side of the septum, until it reaches the uvula. Then, pushing forward the spring, the button will readily pass into the mouth, its passage in front of the uvula being facilitated by the forefinger introduced into the mouth. When the button is near the teeth, one end of the ligature should be drawn out of the mouth, and a pellet of charpie attached to it by tying the ligature round

PLATE XIX.

ANATOMY OF THE INTERNAL NOSE, TOGETHER WITH THE OPERATIONS
FOR NASAL POLYPI.

Fig. 1. A vertical section of the Head, in its median line, so as to show the interior of the Nose, Mouth, and Throat. 1. The middle turbinated bone. 2. Inferior turbinated bone. 3. Anterior and cartilaginous portion of the nostril. 4. Middle palatine suture. 5. Roof of the mouth. 6. An ear catheter passed along the floor of the nostril and entering the orifice of the Eustachian tube. 7. Middle meatus of the nose. 8. Inferior meatus, near the nasal orifice of the ductus ad nasum. 9. The sound of Laforest introduced into the duct. 10. Section of the uvula. 11. Bellocque's canula passed along the floor of the nostril and soft palate, behind the uvula into the pharynx. The spring has been protruded, and the ligature with the pellet of charpie attached is about to be drawn back into the posterior nares in order to close one side, as in tamponing the nostril. 12. The epiglottis cartilage. 13. Section of the œsophagus. 14. Genio-hyoglossus muscle. 15. Origin of genio-glossus muscle. 16. Section of lower jaw at the chin. 17. Structure of the chin. 18. A probe introduced into the buccal orifice of the duct of Steno.

After Bernard and Huette.

Fig. 2. A front view of the manner in which the loop is seized and drawn forwards in the operation of tamponing the nostril.

After Bourgery and Jacob.

Fig. 3. A vertical section of the Nose, showing the application of a ligature around a guttural polypus by means of the "porte" of Charriere.

1. The ligature passed in a loop through the nostril. 2. The "porte" which has seized it in the pharynx, and directed it around the base of the tumor. This instrument opens at the end by means of a spring, so that it can seize or be detached from the ligature without difficulty. The forefinger of the surgeon will often do quite as well.

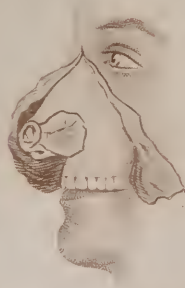
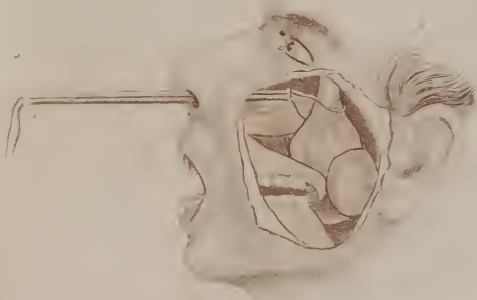
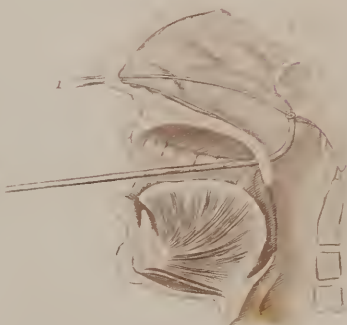
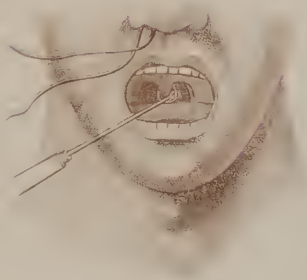
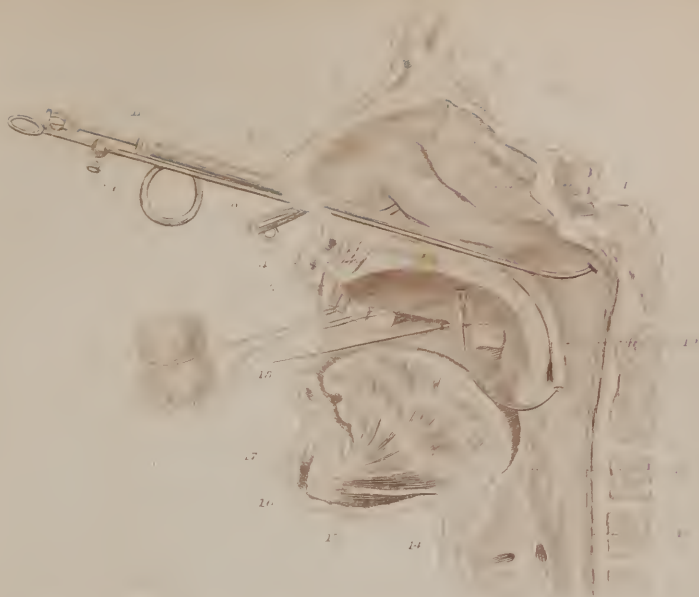
After Bernard and Huette.

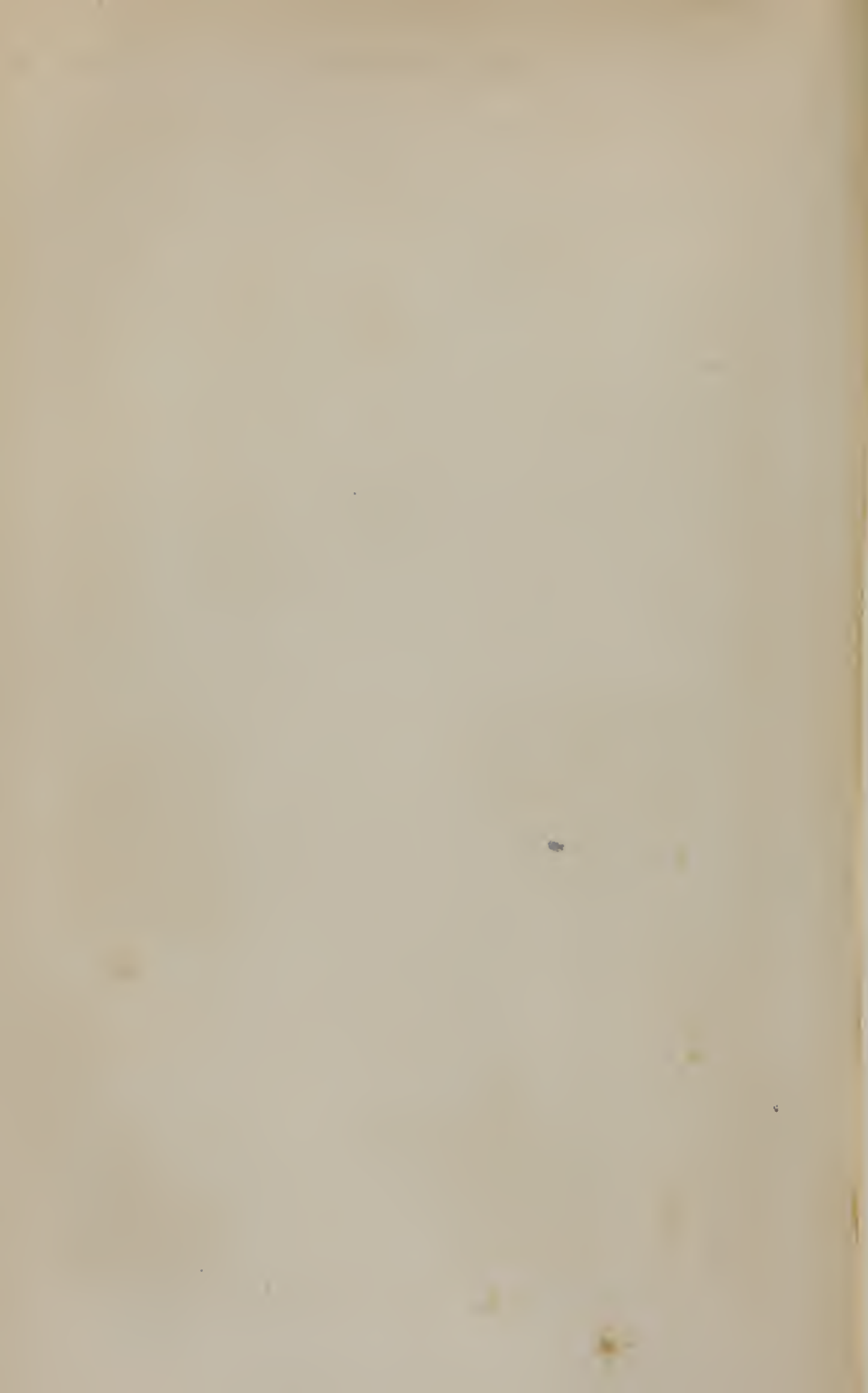
Fig. 4. Section of the Face, so as to show the removal of a pyriform nasal polypus, by means of the wire ligature and double canula as practised by Physick.

After Bell.

Fig. 5. A side view of Dr. Mott's operation for the removal of a large nasal polypus, which filled the entire nostril. The integuments have been incised and dissected back, whilst the dotted lines show the course of the saw through the bones.

After Mott.





its middle. (Plate XIX., Fig. 1.) Then, on withdrawing the spring into the canula, and removing it from the nose, the pellet will be drawn up into the posterior nares, so as to leave one end of the ligature in the mouth, and the other in the nostril. It only remains to plug up the front of the nostril, and tie the two ends of the ligature rather loosely in a loop near the teeth, or to carry them towards the cheek and fasten them with adhesive plaster.

Should the surgeon not be able to obtain Bellocque's canula, he may readily carry a ligature through the nostril and mouth by means of a common elastic catheter; the ligature being passed through the eye of the instrument, and the latter withdrawn after the pellet is in position. In either case, after the lapse of several hours, the lint in front of the nostril should be removed by the fingers or forceps, and that from the posterior nares displaced either by pressing it into the throat by a probe, whence it may be drawn by the thread left attached to it for this purpose, or it may be drawn out simply by employing the end of the ligature left in the mouth.

§ 2.—POLYPI IN THE NOSTRILS.

PATHOLOGY.—In order to appreciate the value of the different modes of treatment which have been proposed for the relief of polypi, it is necessary that reference should be briefly made to their structure and general position. Various divisions of polypi have been described by writers, and especially by Dupuytren, in all of which more attention has been given to their consistence than to their general pathological characters. In an excellent paper by Dr. John Watson, of New York,¹ much has been added to our knowledge of the origin and structure of these tumors, and I cannot present the reader with any details more valuable than those furnished by his article. From this, the following account is, therefore, condensed.

KINDS OF POLYPI.—Six kinds of polypi may be noticed in connection with the surgical affections of the nostril.

1st. The mucous or soft polypus, caused by the accumulation of mucus within the muciparous follicles, and arising either from a change in the consistence of the mucus itself, or from obliteration

¹ Amer. Med. Journ., vol. iii. p. 325, New Series, 1842.

and obstruction of the ducts; resembling, in this respect, the sebaceous and eneysted tumors of the scalp and other portions of the body, all of which, like polypi, may become pedunculated if acted on by the weight of the contents of the sac.

2d. The polypus from hypertrophy, induration, and infiltration of the mucous and submucous tissues of the nostril, and similar to the tumors frequently seen near the lower part of the rectum. These tumors are, in fact, a prolapse of the thickened and infiltrated Schneiderian membrane, and attended with an effusion of fluid into the subjacent cellular tissue, as the result of inflammation.

3d. Fleishy polypi or earuncular excrescences, of a florid red color, and though not painful except when irritated, possessed of a certain degree of sensibility. These are less disposed to assume a pedunculated attachment than any other benign form of polypi. Similar growths have been found at the inner edge of the meatus urinarius of the female, and in the external meatus of the ear, by Sir A. Cooper, and others have seen them in the rectum.

4th. Fibrous polypi, supposed by Velpeau to have their special origin in the fibrous tissue covering the bones in the nasal cavity, and to lie between the bone and the proper mucous tissue. When very large, these are usually found projecting into the posterior fauces, though the other forms may also project either forwards or backwards. These tumors are, as stated by Dr. Watson, invariably attached by a firm and fibrous pedicle.

5th. Gelatinous polypi, which are of rare occurrence, Dr. Watson having seen but one. In this case, the disease appeared to have originated in the antrum between the mucous membrane and the bone, and then to have encroached on the surrounding parts. It was surrounded by a sort of imperfect capsule, with subdivisions of cellular tissue, some of which were exceedingly delicate, and all of them filled with a gelatinous, semi-fluid substance of a transparent pale white or amber color. At some points, this matter was more like soft calf's-foot jelly, without any visible envelop, but here and there the tumor contained opaque, grumous, bloody deposits. The bones retained their proper character, and had not degenerated, and all the surrounding tissues were simply affected by the pressure of the tumor.

6th. External polypi, generally called lipoma, and referred to in a previous page.

7th. Carcinomatous polypi, most frequently originating in the

periosteum or bony structure of the upper jaw, and, sooner or later, invading and deranging surrounding tissues.

SEAT OF POLYPI.—This is to be ascertained mainly by dilating the nostril, by introducing the blades of the dressing forceps, or by a speculum, or by directing the patient to blow through the nostril so as to force them forward.

Most frequently, polypi arise from the membrane spread over the turbinated bones, or near the orifice of the maxillary sinus, being seldom found on the septum, and also as rarely arising from the floor of the nostril. The first two forms are generally confined to the tissues lining the external and upper wall of the nostril. The third form, though not so strictly limited, is often found near the external orifice of the nostril at or below the turbinated bones. The fourth is most frequently found to arise in the posterior fauces immediately behind the top of the septum, or probably from the septum itself.¹ In a case which I attended in consultation with my friend, Dr. J. M. Wallace, the tumor extended from this point along the body of the sphenoid bone, and left it perfectly denuded of its periosteum, as was shown after its removal.

The fifth, or gelatinous polypus, as already seen, arises in the antrum Highmorianum, and the sixth, though frequently arising on the nasal surface of the upper maxillary bone, is restricted to no definite point of attachment.

OPERATIONS.—The mucous polypi may frequently be cured by the plan proposed by Dr. Watson, of puncturing them and evacuating their contents, after which the sac wastes away. The extraction of other polypi may be attempted either by the polypus forceps, by the wire ligature and double canula of Physick (Plate IV., Fig. 12), or by the knife, caustics sternutatories, &c., being comparatively limited in their application, or resorted to either as palliative means, or as adjuvants to other plans of treatment.

REMOVAL BY THE FORCEPS.—The patient being directed to blow his nose, and being seated before a good light, with his head well supported, introduce the forceps closed, and, with the width of the blades corresponding to the vertical diameter of the nostril, grasp the tumor as near as possible to its base; then, rotating the instrument in the hand so as to twist the tumor, pull it away with a jerk as soon as it is felt to yield to the torsion movement.

¹ Watson, *loc. citat.*

STRANGULATION AND EXTRACTION BY THE WIRE LIGATURE AND DOUBLE CANULA.—This plan, which is that most frequently resorted to in the United States, and which is the least liable to injure the bony structure, is practised as follows: Pass a piece of well annealed iron wire through the barrels of the canula, and fasten one end firmly around one wing of the instrument. Then, seizing the free end of the wire, push or pull it through one of the barrels of the canula until a loop of the proper size is formed at the end which is to be passed into the nostril. On carrying this into the nose with the loop parallel with and close to the septum, turn it transversely beneath the fundus of the tumor, and endeavor to slide it over and up to the pediculated portion (Plate XIX., Fig. 4); after which the free end of the wire should be seized with forceps similar to those used by bell-hangers, and drawn as tightly as possible. If the polypus is not too dense in its structure, this will constrict its pedicle to a mere shred, and it only remains to tear it away at the end of the canula, in the loop thus tightened. After a few minutes, the patient should be again directed to blow his nose, especially on the side affected, when, again forming a loop, fish about in the nostril for another tumor, which is to be extracted as before.

In large polypi, and especially where they protrude by the posterior nares, it may become necessary to strangle them and leave them to slough off. When the wire ligature can be made to surround the tumor, the more perfect strangulation accomplished by it should cause the surgeon to give it the preference. But its large size will occasionally preclude its use in this manner. In the case of a large polypus which projected behind the soft palate as low as the extremity of the uvula, and filled completely the posterior nares and cavity of the nose, Dr. Physick, after vainly attempting to extract it with the ligature and forceps, passed a portion of tape made stiff by means of a piece of silver wire into the nose and throat, and getting it around the base, tied the tumor in this manner. In a similar case in which I assisted Dr. Wm. Gibson, a violin string was passed around the base by means of Bellocque's canula, and both ends brought out of the nostril, when they were passed through the barrels of a canula and the tumor strangulated, as in the usual application of the wire ligature. The canula was kept in the nostril until the third or fifth day, when the tumor sloughed off.

OPERATION OF Dr. MOTT.—In a large fibrous polypus, which

filled the nostril, Dr. Valentine Mott removed the tumor after the ligature had failed, by making a section of the soft parts from the inner canthus of the eye to near the angle of the mouth, and sawing out the greater part of the os nasi, ascending ramus of the superior maxillary and inferior turbinated bone.¹ (Plate XIX., Fig. 5.)

EXCISION.—Except in the very rare cases of exceedingly firm polypi, or those near the nasal orifice, this operation is seldom practised. When resorted to at the anterior orifice, the tumor should be hooked forwards, and excised either with a probe-pointed bistoury, or with scissors, though the first is preferable.

In all these operations, if the subsequent hemorrhage is excessive, tamponing the nostril may be required.

VALUE OF THESE OPERATIONS.—In most cases, the wire ligature and double canula will prove most serviceable, next the forceps, and lastly excision, simple polypi requiring only to be punctured, or their coats to be ruptured by sternutatories, in order to evacuate their contents.

CHAPTER X.

SECTION I.

ANATOMY OF THE EXTERNAL PORTION OF THE MOUTH.

IN studying the parietes of the mouth, two parts are to be separately noticed: first, its orifice as formed by the lips, and second, its sides as constituted by the cheeks. The tissues composing both these portions are the skin, cellular substance, fat, bloodvessels, muscles, and nerves, together with the mucous membrane.

The skin and cellular substance present nothing requiring a special description. The muscles of this region are the orbicularis oris, closing the orifice of the mouth; the zygomatici and levatores anguli oris, which draw back its angles; the buccinator, which dilates its cavity, and forms the greatest portion of the sides of the cheek;

¹ Am. Journ. Med. Sciences, vol. v. p. 87, 1842.

and the masseter, which assists in closing the jaws, being inserted into the lower jaw in advance of its angle. The depressors and levators of the lips complete the enumeration.

The principal bloodvessels are the facial artery and vein, with their branches, both of which pass on to the face, side by side, over the surface of the inferior maxilla, directly in advance of the anterior edge of the masseter muscle; being at this point quite superficial, they may be readily compressed by the pressure of the finger against the jaw just in advance of the muscle. The nerves are the branches of the seventh pair (*portio dura*), which are widely distributed over the face after it emerges from the parotid gland (Plate XXIV., Figs. 1, 2), and the infra-orbital (second branch of the fifth pair), which, coming out through the infra-orbital foramen of the superior maxillary just below the middle of the orbit, is also freely distributed to all the tissues. Expression and motion are due to the *portio dura*, and sensation to the branches of the fifth pair.

The salivary glands (Plate XXIV., Fig. 1), although opening into the mouth, are yet so situated as to be rather intermediate to the head and neck; and the description may, therefore, at present, be limited simply to their ducts as mainly belonging to the region under consideration, the position and operations practised upon the glands themselves being reserved for the account of the neck, owing to the importance of their vascular connections with this part.

The duct of Steno, or the parotid duct, departs from the anterior edge of the gland, a few lines below the zygoma, traverses the outer face of the masseter, and perforates the buccinator muscle and the lining membrane of the mouth, so as to have its orifice opposite the second large molar tooth of the upper jaw (Plate XIX., Fig. 1). Its position may be accurately marked by drawing a line from the tip of the nose to the lobe of the ear (*Physick*). The duct of the submaxillary gland may be found opening by a small projecting orifice on the anterior margin of the *frænum linguæ*. The ducts of the sublingual open either into that of the submaxillary, or directly into the mouth, on either side of the *frænum*.¹

The further details of this portion of the face, being of but little practical value to the surgeon, may be omitted, with a simple reference to the explanations of the figures (Plate XIX., Fig. 1, and Plate XXIV., Figs. 1, 2).

¹ *Horner's Anatomy.*

SECTION II.

OPERATIONS ON THE LIPS.

The operations upon the lips are chiefly those required for the cure of harelip, of cancer, of contraction or closure of the mouth, and for cheiloplasty or the formation of a new lip.

§ 1.—SIMPLE HARELIP.

The congenital defect of union in the two halves of the lip, termed Harelip, may usually be remedied by paring off or freshening the vertical portion of each half, and then uniting them by suture.

Various modes of accomplishing this have been proposed by surgeons, but differ mainly in the character of the incision. Without, however, referring to these in detail, this account may be limited to that which I have generally found successful.

OPERATION.—The child, being either firmly held, or with its arms bandaged to its side or tied up in a bag, the end of which is drawn around its neck, should be placed in a semi-recumbent posture, or, if lying down, raised up from time to time during the operation, so as to prevent the escape of blood into its throat and stomach, as this is apt to induce fever. Then seizing the left half of the lip with the left forefinger and thumb, dissect it freely from its attachment to the gum, and seizing the right half in the same manner, dissect it also freely from the gum, this free dissection of the lip from its attachments being essential to success, by diminishing the subsequent strain on the line of union. After freeing the lip very fully at this point, next introduce a spatula of shingle, or other soft wood, beneath the lip, and have its free extremity held by an assistant. Then seizing the left half at its free angle, with a tenaculum or forceps, extend the flap upon the spatula, and, commencing at the nostril, cut through the lip, so as to make the incision to its lower edge, in a slightly semicircular or bent direction, like an **A** jointed or bent outwards at the crosspiece, the joint or angle being near but not quite in the centre, as proposed by Dr. J. Rhea Barton, and also by Guerin¹ (Plate XX., Fig. 1).

¹ Gazette Médicale, June, 1844.

PLATE XX.

OPERATIONS PRACTISED ON THE LIPS AND MOUTH.

Fig. 1. A front view of a single Harelip with the lines of the incision for freshening the edges as advised by Dr. Rhea Barton. 1, 1. The semi-elliptical incisions. Modified from Bernard and Huette.

Fig. 2. Operation of Mirault, of Angers, for single Harelip. 1. The flap cut from one side. After Bernard and Huette.

Fig. 3. The same operation, showing the line of union and position of the principal pin. After Bernard and Huette.

Fig. 4. Front view of a double Harelip, showing the septum or anterior edge of the inter-maxillary bone, containing the two central incisor teeth. After Bernard and Huette.

Fig. 5. Application of the single Harelip Suture to the case, shown in Fig. 1. After Bernard and Huette.

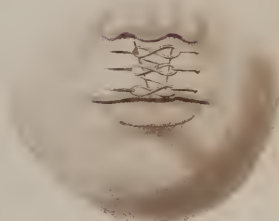
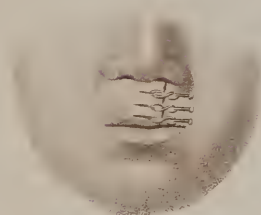
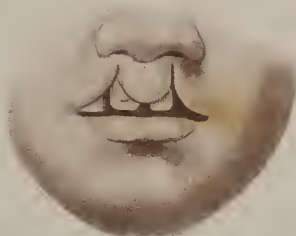
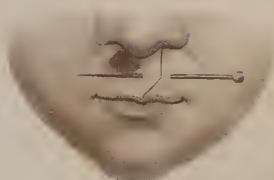
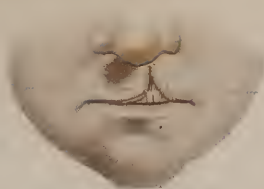
Fig. 6. The union of the parts, after the operation of double Harelip, when both sides are to be united at the same time. The risk of sloughing of the central part from excessive inflammation or want of vitality, is an objection to this mode of operating. After Bernard and Huette.

Fig. 7. A contracted Mouth consequent on ulceration, showing Diefenbach's operation. 1, 2. The integuments as left by the two incisions which start from 3, the mucous membrane remaining untouched. 3. Point for the introduction of the scissors. 4, 5. The lines of incision. The ulceration has exposed the gums and teeth at the opposite corner of the mouth. After Bernard and Huette.

Fig. 8. View of a Mouth, as contracted in consequence of an ulcer. 1, 2. The two points at which the sharp-pointed scissors were introduced so as to divide the integuments on both the upper and lower lip, towards the median line. The mucous membrane, being subsequently divided, was reflected over the edges of the incision and fastened to the skin by several points of the interrupted suture. After Bernard and Huette.

Fig. 9. The appearance of Fig. 8 after the integuments have been removed.

1. The mucous membrane untouched. This is to be divided in the median line of the mouth, and reflected so as to form a rounded edge to the new lips. After Bernard and Huette.



This edge of the lip being then seized by the assistant, the coronary artery may be compressed between the thumb and forefinger, so as to check the bleeding.

The opposite half being now treated in the same manner, the wound will exhibit two almost semi-elliptical cut surfaces, so arranged as to present their concavity towards the median line of the fissure. (Plate XX., Fig. 1.)

Then, passing a ligature through the lower edge of each flap, and drawing upon it, adjust accurately the angles of the incision to the same level, and giving the ligature into the hand of an assistant, so as to preserve their position, pass a sharp-pointed steel or insect pin through the flaps from left to right, taking care not to carry it through the mucous membrane. After surrounding this pin with a twisted suture, next introduce a second or even a third pin, and approximate the surfaces of the incision well up into the nostril by other ligatures (Plate XX., Fig. 5), when the ligature first introduced at the lower edge of the lip, and which should have been held by the assistant during this time, may be withdrawn.

DRESSING.—After cleansing the lip, and cutting off the points of the pins, the sutures should be firmly supported by strips of adhesive plaster, slit so as to allow the ends of the pins to pass through them, and extended from the front of one cheek across the lip to the other cheek, in order to take the traction off from the pins. Four days subsequently, the latter must be withdrawn by a rotatory movement, without, if possible, disturbing the ligatures or plaster, as may be readily accomplished either by nicking the latter over the head of the pins, or by drawing them through the slits made in the strips previous to their application. On the fifth day, the cheeks being well supported by an assistant, these strips may be removed, and new ones applied every three days during the first week or two, until the union is accomplished. Throughout, or at least until the sixth day, the child, if unweaned, must be fed with a spoon, but after this it may be allowed to suck with the plasters on. During the first twenty-four hours after the operation, it is also especially necessary that the patient should be watched, lest hemorrhage occur, and the blood, escaping into the mouth, be carried into the stomach, without the bleeding being suspected. If, however, the pins are inserted in the lip deeply enough to pass behind the coronary arteries, the compression of

these vessels by the ligature will allow but little probability of hemorrhage.

REMARKS.—The advantages of the semi-elliptical incisions over those which are straight, will be found in the absence of the notch in the lip, usually consequent on the contraction of the wound, the angular character of the incisions preventing the linear shortening of the cicatrix. The value of the temporary ligature in the free edge of the lip will also be found in the greater accuracy with which the angles can be adjusted before inserting the first pin.

MIRAULT, of Angers, France, operates as follows: By a straight incision he pares off one-half of the fissure (Plate XX., Fig. 2). Then, incising the other portion (generally the left), he cuts it so as to leave a pedicle of the membrane on the free edge of this flap, which, being carried across the fissure and united to the opposite half, prevents the formation of any notch or depression (Plate XX., Fig. 3).

MALGAIGNE, in order to avoid the notch on the free surface of the lip, makes a curved incision from above downwards, so as to pare off the mucous covering of the fissure, but without cutting it free from the inferior angle or that continuous with the margin of the lip. Leaving the portion thus pared off adherent, and depending by this pedicle, he unites the wound by pins and the twisted suture. Then, trimming and shortening the pediculated portion with the scissors until there is only a piece in each half long enough to fill up the notch, he unites them on a level with the lip by a small and fine pin.¹

REMARKS.—Judging from personal observation, Harelip is a very common complaint, it having occasionally happened to me to have three patients under treatment at one time, and in one winter at the Clinic of the University of Pennsylvania, ten were treated in the course of six months. Out of the large number that have been seen (I should think more than fifty), but two failures have occurred, after pursuing the plan above stated, and in one of these (double) the result was undoubtedly due to an attack of cholera infantum, of which the child died. After the operation, as performed by the scissors and the ordinary straight incision, I have seen several (five?) failures. As respects the period for the operation, I have generally selected the earliest possible time, after the

¹ Operative Surgery, by Brittain, p. 334, Philadelphia edition.

tissues seemed to be firm, usually soon after the third month of infancy, and I have always deemed it necessary to continue the adhesive strips a week after the removal of the pins.

Dr. J. Mason Warren, of Boston, as well as several other surgeons, also prefer an early period for their operations, but resort to the interrupted suture in place of employing the harelip pins.

Dr. A. L. Peirson, of Salem, Massachusetts, has succeeded in several cases, where he operated within the first twenty-four hours after birth, and advocates¹ this early operation, as being especially advantageous, from the tendency of the infant to sleep at this period.

M. Guersent, Surgeon of the Children's Hospital in Paris, has also recently performed the same operation successfully on an infant only one day old.²

Dr. J. Mason Warren has permitted nursing during the process of healing, in the case of an infant one month old, on whom he had operated, and employed three sutures without inconvenience, it being evident that there was no strain on the lip during the act of sucking.³

§ 2.—DOUBLE HARELIP.

In the variety of the disease known as Double Harelip, there is usually a double fissure in the lip and palatine portions of the mouth, together with a tubercle or intermediate structure resembling and corresponding with the inter-maxillary bone of animals (Plate XX., Fig. 4). The projecting extremity of this bone usually contains either the germs of the incisor teeth, or the teeth themselves, according to the age of the patient, and is often a source of difficulty, by causing the interruption of the circulation through the middle flap.

ORDINARY OPERATION.—If the central flap is to be preserved, it should be first freed from its attachment to the gum, but with judgment, lest its vitality be impaired from want of base. Then one of its edges being freshened with the scalpel and wooden spatula, the opposite half of the fissure should be freed from its attachment and

¹ Bost. Med. and Surg. Journ., vol. xlvii. p. 134.

² South. Med. and Surg. Journ., vol. vii. p. 641.

³ Amer. Journ. Med. Sciences, Oct. 1851.

also freshened, as in the operation just detailed; the remaining portion of the operation being performed as in that for simple fissure. After a few weeks, when the union is firm, the remaining half of the lip may be operated on in a similar manner, or, if circumstances induce the surgeon to think it advisable, both sides may be united at the same time by transfixing them with the pins, as represented in Plate XX., Fig. 6.

REMARKS.—Some surgeons prefer, in double harelip, the performance of the operation on both sides of the fissure at the same period, but, in my experience, this has seemed more liable to failure: 1st, because the stress upon the pins, or upon the newly-formed cicatrices after their removal, is much greater when both sides are thus operated on; and 2d, from the inflammation or compression of the middle flap by the ligatures being more apt to induce sloughing. To operate first on one side and then repeat it on the other, will, it is thought, in most instances, prove preferable. When the incisor teeth project outwardly, it will generally be necessary to extract them, or to cut off the inferior anterior extremity of the projecting intermaxillary bone before proceeding to the incision in the lips. But in children, unless the portion of the alveolar processes to be removed is limited, the germs of the permanent incisors will be entirely destroyed. When the projection necessitates interference, I prefer therefore the plan proposed by Blandin, of excising, with bone nippers or strong scissors, a triangular piece of the septum, with its base downwards, behind the alveolar processes, and then bending or forcing back the projecting portion, as any attempt to push back this end of the bone by bandages alone is very apt to induce such inflammation in the soft parts as will necessitate their removal.

The fissure so often seen in the hard palate, in connection with both simple and double harelip, may subsequently require an operation, though it will often be much diminished or cured, simply by the contraction and constriction of the bones consequent on the union of the fissure in the soft tissues of the lip, especially if the patient is operated on at the early period mentioned. The treatment of the fissure in the soft palate will be referred to under the head of Staphyloraphy.

§ 3.—CANCER OF THE LIP.

This affection may be seen either in the form of a scale or scab of an epithelial character, as a shot-like tumor, as a larger induration, or as an extended ulcer. The treatment will, of course, vary according to the character or development of the complaint. In the simpler or epithelial variety, the protection of the surface from the action of the air and the secretions of the mouth, will sometimes enable the parts to heal, and prevent the increased deposit which is so liable to ensue in a cancerous diathesis upon any increase of circulation in the part. Among the articles employed for this purpose, collodion seems to have been most frequently tried; but, as it is not very thick, it is not easy to prevent its cracking in the motions of the part. Dr. Dugas, of Georgia,¹ has lately recommended a solution made by dropping small fragments of gutta percha into a vial containing chloroform, until the solution acquires the consistence of thick mucilage; then with a camel-hair pencil applying this solution to a sore, which, during eighteen months, had resisted chloroform and many other applications, he found that in less than a month it was well. When the surgeon is satisfied that the removal of the tumor will retard the progress of the disease, he may excise it by an elliptical incision around its base, in the same manner that he would remove a tumor in any other part of the body; but as these cancerous affections are apt to invade the surrounding tissues, and the parts here involved possess much vitality, he should be especially careful to cut away such an amount of the adjacent sound parts as will insure the entire removal of the complaint. As the best and simplest mode of operating, he may proceed as follows:—

ORDINARY OPERATION.—Make, either with the scissors or scalpel, a V incision of such a size as is necessary for the entire removal of the disease, with its base corresponding to the free margin of the lip. If the scalpel is used, a wooden spatula should be placed so as to support the portion cut, during the incision; after which the wound may be united as in harelip. From the great extensibility of the cheeks, very considerable portions of the lips, and especially of the lower one, may be removed without deformity; and I have

¹ New Orleans Monthly Medical Register, vol. ii. p. 7, 1852.

seen two patients, in each of whom I had removed a piece over one inch in width at the base of the **V**, three years previously, for cancer, and in both of whom it is difficult to see any deficiency.

Should the disease require the loss of more tissue than can be supplied by approximating the sides of the incision, resort must be had to the formation of a new lip, or to the operation of **CHEILO-PLASTY**, as hereafter shown.

§ 4.—ENLARGEMENT OF THE MOUTH.

The operation of re-establishing the orifice of the mouth is one that is occasionally rendered necessary in consequence of its contraction or closure from the cicatrices resulting from ulceration or burns. Among the best plans of operating in these cases is the very ingenious one of the late Professor **DIEFFENBACH**, of Berlin.

DIEFFENBACH'S OPERATION.—Wishing to preserve enough of the mucous membrane to cover the edge of the incisions required in enlarging the mouth, Dieffenbach introduced into the patient's mouth the forefinger of one hand, and sticking the point of one blade of the sharp-pointed scissors into the cheek a line or two beyond the point at which he wished to make the new angle of the mouth, he transfixed all the tissues except the mucous membrane (Plate XX., Fig. 8). On pushing the point forwards to the contracted orifice, he was enabled to incise all this texture in the line (3, 5) of the free edge of the lower of the new lips; then, reintroducing the point of the scissors at its first place (3) of entrance, he divided these textures also, with the exception of the mucous membrane, in a line (3, 4) corresponding with the free edge of the upper lip.

The triangular piece (3, 4, 5,) being then carefully dissected off from the lining membrane of the mouth (1, 2), the latter was left uninjured (Plate XX., Fig. 9).

On dividing this membrane in the middle, to within two lines of the angle of the first incisions, it only remained to attach it neatly by sutures to the bleeding surface in order to complete the mouth.

On two occasions I repeated this operation (Plate XX., Fig. 7) with entire satisfaction; and many other surgeons, especially Dr. Mütter, have reported similar instances of success.¹

¹ Am. Journ. Med. Sciences, vol. xx. p. 342.

After union has taken place, the resemblance of the new mouth to a normal one is often excellent.

§ 5.—CHEILOPLASTY.

Plastic operations for the restoration of the lips may be required in diseases of either of them, though it is most frequently demanded in that of the lower lip. In either case, the operation is termed Cheiloplasty. In the upper lip it may be performed by adapting a flap taken from the arm to the deficient portion, as in the old Taliacotian operation; but the greater facility afforded by approximating the edges of the deficiency, as in the ordinary harelip operation, renders this mode of operating a rare occurrence.

The Taliacotian operation has also been applied to the lower lip, but there is as little to recommend it in this as in the former case, and the loss of substance from cancerous degeneration or ulceration, when so extensive as to require any plastic operation, may be more readily supplied by either of the following methods:—

OPERATION OF DR. J. PANCOAST, OF PHILADELPHIA.—In a case of cancer of the lower lip, Dr. Pancoast excised the diseased margin of the lip by an incision which entirely circumscribed it. A vertical incision was then made in the middle line of the chin nearly down to the level of the os hyoides, and crossed by a horizontal cut over the base of the lower jaw-bone. The four angular flaps, thus formed, being now dissected up from the jaw and the angles of the crucial incision, or the ends of the flaps removed so as to leave a lozenge-shaped space (Plate XXI., Fig. 3), the margins of the upper flaps were brought to the level of the angles of the mouth, and united on the median line by the twisted suture, after which the lower flaps were united, so as to cover the point of the chin.¹

OPERATION OF CHOPART.²—CHOPART, in a case of cancer of the lower lip, included all the diseased structure between two parallel vertical incisions, which, commencing at the margin of the lip, extended down to near the os hyoides. These incisions formed a square flap, which was dissected off from the chin from above downwards (Plate XXI., Fig. 4). The diseased portion being then cut

¹ Pancoast's Operative Surgery, p. 356, Phila. 1844.

² Bernard and Huette, p. 179.

PLATE XXI.

THE OPERATIONS OF CHEILOPLASTY AND GENIOPLASTY.

Fig. 1. A side view of Dr. Mütter's operation for the Formation of a New Check. The edges of the ulcer which resulted from extreme salivation were first freshened, the useless teeth extracted, and four flaps formed by incisions in the course of the dotted lines so as to permit the approximation of the edges of the flaps.

After Mütter.

Fig. 2. A three-quarter view of Dr. Mott's operation for the relief of Anchylosis of the Jaw dependent on Cicatrization of the Mouth, with the restoration of a part of the Cheek. 1. The cicatrix arising from an ulcer. This was entirely excised, leaving an opening in the cheek. 2. The tongue-shaped flap, cut to fill up the opening by being rotated upon its base.

After Mott.

Fig. 3. A front view of the operation of Dr. Pancoast for the removal of an extensive Cancer and the formation of a new Lower Lip. The cancer is shown as circumscribed by a curvilinear cut. A vertical incision in the median line of the chin, extended from the curvilinear cut nearly to the os hyoides, and another which was horizontal and parallel to the base of the lower jaw, formed four flaps. The angles of the flaps being removed, the upper flaps, 1, 2, were raised to the proper level, and united by the twisted suture on the median line, when the lower flaps, 3, 4, were also united on the median line so as to cover the front of the chin.

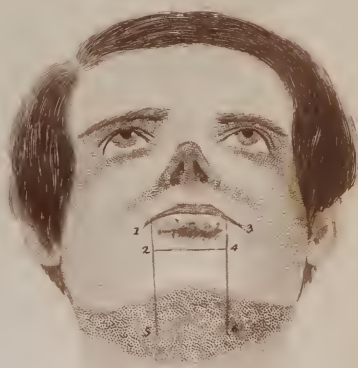
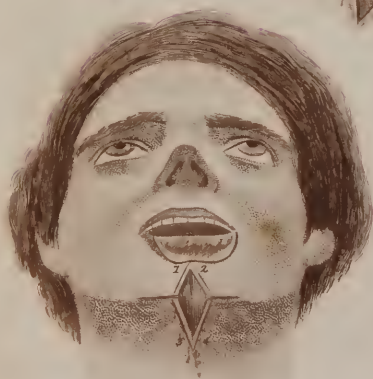
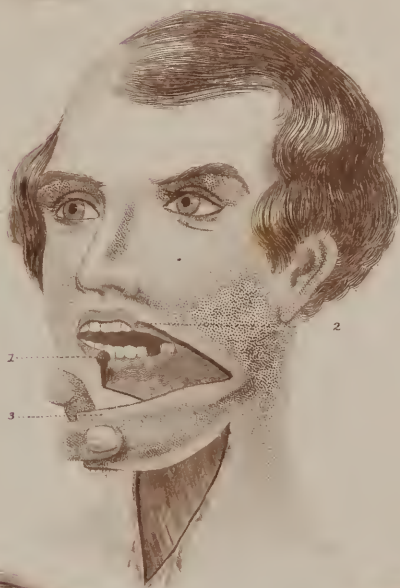
After Pancoast.

Fig. 4. A front view of Chopart's operation for the same object. 1, 5, 3, 6. The vertical incisions. 2, 4. The horizontal cut circumscribing the disease. 2, 4, is to be raised to the level of 1, 3.

After Bernard and Huette.

Fig. 5. Operation of Lallemand for closing the gap left by the excision of a Cancer which involved the angle of the Mouth and a portion of the Cheek and Lower Lip. 1. The remaining portion of the lip, which is to be drawn over to the angle of the mouth at 2. A flap formed of the integuments of the neck having been dissected off, is shown as being partially rotated on its base, and about to be carried up to cover the deficiency. The wound on the neck may either be approximated at its edges, or left to heal by the second intention.

After Bourguery and Jacob.





off by a horizontal incision, the head was slightly flexed and the flap drawn up to the level of the angles of the mouth, where it was maintained by several stitches placed in the line of the vertical incisions.

When the preservation of a portion of the mucous membrane can be accomplished, it will add much to the natural appearance of the new lip.

OPERATION OF MALGAIGNE.—This accomplished surgeon removes all the diseased structure either by a \vee incision, or by two vertical incisions, which, starting on each side of the cancer, reach to the chin, and are there united by a horizontal cut, as in the upper incision of the operation of Chopart.

In the \vee incision, in consequence of the triangular wound, it is necessary to prolong the angle of the mouth on each side by a transverse cut, and to dissect the flaps so as to give them a triangular shape. Then, drawing them forward, and uniting their vertical edges by sutures upon the median line, it only remains to close the horizontal incision, in order to obtain a proper fulness for the lip.

In the two vertical incisions, the gap being square, it is necessary to make two horizontal cuts, by which the angles of the mouth may be elongated. Then, making another horizontal cut parallel to the base of the jaw, detach the two square flaps thus formed, and unite them on the vertical or central line, as well as on the horizontal incisions, when the cheeks will be made to contribute to a lip which contains a portion of the orbicularis, as well as the lining membrane of the mouth.¹

Dr. PANCOAST, in a case of extensive loss of substance from the explosion of gunpowder, also made a new lip by the following process:—

PANCOAST'S OPERATION.—After removing the rounded edges of the cicatrix in a \vee -shaped piece, he carried two curved incisions from a point four lines above the apex of the \vee (which was on a level with the lower surface of the inferior maxilla) in the direction of the extremities of the os hyoides. Then, freely separating the integuments from the bone and rotating the flaps a little upwards, he drew them inwards, and united them to each other on the middle line by two twisted sutures, closing the incision below the chin with

¹ Malgaigne, *Op. Surg.*, p. 340, Philad. edit.

adhesive strips.¹ Other instructive cases are reported in the same paper, which is amply illustrated by wood-cuts.

OPERATION OF DR. FRANK HAMILTON, OF BUFFALO.²—A lad, 7 years old, having lost his lower lip and corresponding portion of the jaw from salivation, mastication became difficult, and the saliva poured upon his chin so as to induce excoriation of the face and neck and wet his clothing. To remedy this, Dr. Hamilton, under the impression "that by attaching the skin directly to the periosteum, its displacement by cicatrization and contraction would be prevented," operated as follows:—

FIRST OPERATION.—The upper edge of the skin corresponding to the lower lip being first abraded to the extent of a quarter of an inch each way, from the central line, a perpendicular cut of one inch was made from either end of this horizontal abrasion. Then starting from the lower end of each perpendicular cut, an incision was made outward and downward to the left, and outward and downward to the right, to the extent of one inch and a half.

The two lateral flaps, thus formed, being next dissected from the jaw and slid upwards, were united by sutures above the central piece and their inferior edges also stitched to the upper and abraded edge of the central piece, so that by leaving the central piece attached to the jaw and uniting the lateral flaps above it, the new lip thus formed would be prevented from being drawn down again by the contraction of the wound below. This proved to some extent successful, though the new lip in process of time shrunk to such an extent as to become insufficient, and rendered another operation necessary in order to increase the depth of the lower lip and enable it more effectually to retain the saliva.

SECOND OPERATION.—A single incision being made just under the chin, was extended along the base of the jaw about three inches from side to side, and all the integuments between this horizontal cut and the upper edge of the lower lip being raised from the bone, the entire mass was slid up until its lower edge corresponded with a line just below the upper border of the jaw when the edge of the flap was made fast to the periosteum by several points of the interrupted suture, the wound below being healed by granulation. The result was, that no disposition was shown by the flap to draw down-

¹ Amer. Journ. Med. Sciences, vol. v. New Series, p. 106.

² South. Med. and Surg. Journ., vol. vii. p. 742; from Buffalo Journal, 1851.

wards as the wound cicatrized, but, on the contrary, the skin from under the chin and neck was somewhat drawn upwards.

REMARKS.—This operation presents evidence of considerable ingenuity, and was rewarded by success, as the lad obtained sufficient lower lip to cover the gums and a part of the bodies of a set of artificial teeth.

The idea of attaching the flap to the periosteum is, I believe, altogether a new one, and is stated by Dr. Hamilton to have originated in his observation of the capacity of the periosteum to form new skin, a suggestion which may be usefully remembered in many of the plastic operations demanded occasionally by the ulcerations which follow on excessive salivation.

§ 6.—GENIOPLASTY.

The application of the principles of plastic surgery to the restoration of deficiencies in the cheeks must, like the operations already spoken of, depend upon the peculiarities of the case. The two instances hereafter stated may, therefore, suffice as illustrations of this class of operations.

In a patient of Dr. MOTT's, of New York (see Plate XXI., Fig. 2), in addition to the loss of substance in the cheek consequent on sphacelus during an attack of typhus fever, there was also some false ankylosis of the jaw. To remedy this, he operated as follows:—

MOTT'S OPERATION.—An incision, commencing a little within the upper angle of the mouth, was carried around the outer margin of the cicatrix to a little within the lower angle of the under lip, so as to remove all the newly-formed tissues within it. Then, after overcoming the ankylosis, the lips were brought together at the angle of the mouth by a suture, and a portion of integument sufficiently large, and of a corresponding shape to replace the portion removed, was taken from the side of the jaw and neck (Plate XXI., Fig. 2). This portion, being turned into the space it was intended to fill, left a tongue three-quarters of an inch in breadth connected with the adjacent parts, and sufficient for all the purposes of circulation. The edges being then accurately adjusted by means of the interrupted suture and adhesive strips, and the lower wound drawn together as much as possible by adhesive plaster, the whole was

covered with lint, a compress, and bandage. On the eighth day, adhesion appeared to have taken place at every point, when three of the stitches were removed, and in about one month the patient went home cured.¹

DIEFFENBACH, in cases where the sides of the ulcer could be at all approximated by drawing upon the substance of the cheek, freshened the edges of the opening and united them by sutures; then, in order to obviate the danger of separation of the wound when the sutures were withdrawn, or when the cicatrix was stretched, he made an incision across the base of the flap at the side where the parts were most tense, and left this wound to heal by granulation.

OPERATION OF DR. MÜTTER, OF PHILADELPHIA.—In order to relieve a shocking deformity of the face, resulting from the sloughing consequent on profuse salivation, Dr. Mütter operated as follows: Having first extracted the useless teeth of the upper jaw, which would have prevented the proper adjustment of the flaps, or induced their ulceration, and freshened the edges of the ulcer, he detached the integuments from the side of the jaw, so as to permit some approximation of the wound. Two incisions above and below the ulcer were then made so as to form four flaps (Plate XXI., Fig. 1), and these were united to each other in the line of the teeth, as far forwards as the angle of the mouth. The edges of the remaining ulcer, being partly approximated by the harelip suture, were subsequently caused to cicatrize under the use of the nitrate of silver. The result was entirely satisfactory.²

§ 7.—REMOVAL OF TUMORS FROM THE CHEEKS.

From disease of the buccal glands and other causes, it sometimes becomes necessary to remove tumors from the substance of the cheeks. No other rules need here be given, in reference to elliptical or such other incisions as the case may call for, except two of a general kind: 1st, to make them as much as possible in the line of the zygomatici or levatores anguli oris muscles, so as to conceal

¹ Amer. Journ. Med. Sciences, vol. ix. p. 47, 1831.

² Lecture on the Operations in Surgery, by Robert Liston, with numerous additions, by Thomas D. Mütter, M. D. Philad. edit. p. 244.

the cicatrix by bringing it into the direction of the natural folds of the cheek; and 2d, if the tumor is far back, or towards the angle of the jaw, to guard against injury of the duct of Steno.

§ 8.—SALIVARY FISTULA.

As the position and general anatomy of the duct of Steno have been already given (page 348), it is only necessary at present to mention the operations resorted to, in cases where from wound or ulceration, this duct has been opened and the saliva flows out upon the cheek, so as to form a salivary fistula. Various plans have been suggested for the relief of this defect, but the object of all of them is the same, to wit: to close the orifice on the external side of the cheek, and keep open that upon its inside. The nearer the external opening can be made to approach the character of a simple incised wound, the greater will be the chance of its closure; and the following operation, of Dr. Horner, by reducing the parts to this condition, has, both in his hands and my own, been followed by perfect success. In two patients on whom I have operated, the cure was readily accomplished, the external parts healing by the first intention.

OPERATION OF DR. HORNER, OF PHILADELPHIA.—The patient being seated with the head well supported by an assistant, the operator introduces a strong broad wooden spatula within the cheek of the affected side, where it should be firmly held by an assistant, who also supports the patient's head. The wound being then slightly elongated by incising its sides in the line of the zygomaticus major muscle, a round punch, like that of the saddlers, should be placed over the fistulous orifice, care being taken to avoid the anterior edge of the masseter. Then, on pressing the punch firmly against the spatula within the mouth, a piece of nearly the entire thickness of the cheek will be removed, and a fresh opening made directly into the mouth, when the external wound, being accurately closed by sutures and adhesive strips, will usually heal kindly, and the internal opening be found to give free vent to the saliva. The punch must have a keen edge, and the cheek be well supported inside, in order to obtain a clean cut (Plate XXIV., Fig. 3).

SECTION III.

DIVISION OF THE MASSETER MUSCLE FOR IMMOBILITY OF THE LOWER JAW (FALSE ANCHYLOSIS).

This disease, which has been charged with being peculiarly an American one, owing to its having frequently ensued upon the free salivation at one time so common in certain sections of the United States, was first treated of as a distinct affection by Dr. Mott, of New York.¹ The operation for its relief is especially demanded in those cases where the ankylosis is dependent on cicatrization or contraction of the soft parts, and was first performed by Dr. J. W. Schmidt, of New York, Oct. 1841.² Subsequently, Dr. J. Murray Carnochan, of the same city, published an account of a similar operation performed by him in 1840; but, as his publication was after that of Dr. Schmidt, the latter has generally received the credit of priority. In Dr. Schmidt's case, a young lady, in consequence of rigidity of one of the masseter muscles, caused by an extensively ulcerated throat from which she suffered when a child, had not been able for more than twelve years to open her mouth so that the end of the little finger could be inserted. After dilatation and similar means had failed, Dr. Schmidt operated as follows:—

OPERATION OF DR. SCHMIDT, OF NEW YORK.—A narrow bistoury being passed through the mucous membrane of the mouth immediately in front of the anterior edge of the masseter muscle, on a line with the alveolar process of the lower jaw, the integuments of the cheek were raised from the muscle with one hand, whilst with the other the bistoury was passed over the masseter muscles between it and the integuments, but without cutting through the latter, when the muscle being completely divided to the bone, the mouth was immediately opened by a lever. Considerable hemorrhage followed, and some extravasation into the cellular substance of the cheek, but this soon subsided, and the case succeeded perfectly. To prevent the union and subsequent contraction of the muscle to its former condition, pieces of soft wood of a wedge-

¹ Mott's Velpeau's Operative Surgery, vol. iii. p. 1139.

² Published in the Amer. Journ. of Med. Sciences, p. 516, Oct. 1842.

shape were kept in the mouth during the night, and occasionally during the day.¹

The danger likely to ensue from inattention to the anatomical relations of this region will be readily foreseen by every anatomist, or may be recognized by reference to Plate XXIV., Figs. 1, 2, where the position of the vessels and of the salivary duct is shown after the removal of the parotid gland.

DR. MOTT'S OPERATION.—In seventeen cases of false ankylosis of the jaw, reported by Dr. Mott,² forcible dilation was practised, after, or, in some instances, without division of the contracted tissues. To overcome the contraction and expand the jaws, Dr. Mott employed only a screw and lever, similar to that of Heister, as depicted in the *Armamentarium Chirurgicum* of Scultetus, and also in the *Surgery* of John Bell. The levers, being introduced between the teeth, are gradually expanded by turning the screw.

An instrument suggested, and frequently employed by Dr. J. Rhea Barton (Plate XXIII., Fig. 1), will also be found to furnish an excellent means of relieving ankylosis. Its advantages over the lever of Heister consist in the breadth of its plates, in their being covered by a layer of caoutchouc, and in their affording a better basis for the teeth, in consequence of which the latter are less liable to injury.

REMARKS.—From personal experience, and from an examination of the recent articles published by American surgeons,³ I am satisfied that this complaint is comparatively common, and also that it is frequently very difficult to eradicate. When the result of extended sloughing, or when of many months' standing, the prognosis should be very guarded, as it is not uncommon to find more or less reproduction of the stiffness after the dilating means are discontinued. In more recent cases—say of six months duration—the prognosis will be more favorable. As the immobility, even when due to the muscles in the first instance, generally results in more or less adhesion of the condyles and glenoid cavities, it should be remembered that it is more important to preserve slight and constant motion of the jaw, so as to favor the synovial secretion, than to rely upon great dilatation at an interval of several days. Frictions with anodyne liniments, or the cold douche, applied by pouring water from a small pitcher upon the indurated region, will do much

¹ *Ibid.*, *loc. cit.*

² Mott's Velpeau, *loc. cit.*

³ Bibliography, p. 71.

towards facilitating the cure, as they will promote the absorption of effused lymph, and favor an increased circulation through the muscles of the part. My experience, therefore, leads me to place more confidence in gradual dilatation, frictions, &c., as just stated, than on subcutaneous or other incisions, as I have found the rigidity very apt to return to a greater or less extent, as cicatrization goes on, in consequence of the uniting medium being less extensible than that consequent on the division of a tendon.

CHAPTER XI.

OPERATIONS PRACTISED WITHIN THE MOUTH.

THE operations that may be required in this region are those dependent on diseases of the tongue, tonsils, and palate.

SECTION I.

ANATOMY.

The description of the anatomical relations of the parts within the mouth may at present be confined to such portions of that cavity as are found within the line of the teeth, and require therefore but brief notice.

The Tongue, being composed in a great measure of the genio-hyo-glossus, hyo-glossus, and lingualis muscles, which connect it both with the os hyoides and the lower jaw, is covered by a mucous membrane, the reflection of which to the floor of the mouth constitutes the *Frænum Linguae*. The general arrangement of the fibres of the genio-hyo-glossus, and their expansion from their origin into the bulk of the tongue, may be understood by referring to Plate XXII., Fig. 2.

The Lingual artery is the main source of the blood supplied to the tongue. Coming from the external carotid, this artery penetrates the hyo-glossus muscle just above the os hyoides, and of course lies too deep for any operation upon this organ except its extirpa-

tion (Plate XXII., Fig. 2). The sublingual branch of this vessel, being more superficial, passes forward just above the sublingual gland, near the median line of the tongue, between the mylo-hyoid and genio-hyo-glossus muscles, to supply the floor of the mouth and its lining membrane. Except in an attempt to extirpate the sublingual gland, it is not much exposed to injury in operations upon this part. The ranine artery and its accompanying vein are the continuation of the lingual artery, and advance on each side of the median line of the tongue directly to its tip, where there is an anastomosis of the vessels of each side. The ranine veins are especially superficial, and may be seen just beneath the mucous membrane on turning up the tip of the tongue. They can, therefore, be readily injured, and may give rise to trouble, especially in children. The hypo-glossal nerve is shown in Plate XXII., Fig. 2, and requires no further reference, as it is not proposed to treat of the various wild operations that have been recommended for the cure of stammering.

The Glands of the mouth at present demanding notice are the sublingual, submaxillary, and the tonsil. The Sublingual gland, being only covered by the mucous membrane of the mouth, may be readily seen on turning up the tip of the tongue. Its duct or ducts open into the mouth on either side of the frænum below the tongue. The duct of the Submaxillary gland (Plate XXIV., Fig. 1) terminates by a small projecting orifice on the anterior margin of the frænum. The obstruction of this orifice gives rise to the disease termed ranula, and consists in an accumulation of saliva within the duct, which, by distending the latter, or by forming cysts, creates a tumor. The saliva also sometimes deposits sabulous matter, and gives rise to concretions which are usually situated in the duct itself.

The Tonsil glands (Plate XXII., Fig. 1), in a healthy condition, are six or eight lines long, four or five wide,¹ and about three thick. They are situated within and between the half arches of the palate, and concur in forming the isthmus of the fauces. Immediately beneath or outside of the tonsils, or outside of the cavity, that is, towards the skin of the neck, lies the carotid artery, with the vessels found between the greater cornu of the os hyoides and the angle of the lower jaw. The proximity of these vessels should be remembered by the surgeon when using a bistoury upon these glands, as

¹ Horner's Anatomy, vol. i. p. 569.

there is only a thickness of about three lines of tissue between them and the artery; and a case is reported by Bécclard, in which the internal carotid was opened in an operation upon this region.¹

The Palate is composed of two portions—the hard or bony structure, formed by the palate plates of the palate and superior maxillary bones, and the soft palate, which is composed of the mucous membrane and the muscles. The soft palate stretches across the back of the mouth from side to side, and obliquely downwards and backwards from the posterior margin of the hard palate. Its inferior free margin presents in its centre a projection (uvula) from a half to three-quarters of an inch long in the healthy state.

The Uvula (Plate XXII., Fig. 1) is composed of the azygos uvulæ muscle, which, arising from the posterior pointed termination of the middle palate suture, goes down into the uvula, but the point of the muscle stops a half inch short of its inferior extremity. The free end of the uvula is formed of loose cellular substance covered by mucous membrane, and in catarrhal inflammation often becomes cedematous, swollen, and elongated, so as occasionally to require excision; but this excision should never be extended to the muscle, lest it impair the voice, and give it a nasal twang, from the patient's inability to close the orifice of the posterior nares.

From each side of the uvula proceed two crescentic doublings of the lining membrane, called the Half Arches, and designated as anterior and posterior. Within or beneath these folds lie the muscles of the part, some of which are important in connection with the operations on this region.

The Constrictor Isthmii Faucium is within the anterior half arch, arises from the soft palate near the base of the uvula, and is inserted into the side of the tongue near its root. It will close the opening between the mouth and pharynx.

The Palato-Pharyngius is within the duplicature forming the posterior half arch; it arises near the base of the uvula, and is inserted into the sides of the pharynx, and into the posterior margin of the thyroid cartilage. It draws the soft palate downwards, or draws the pharynx upwards.

The Tensor Palati arises from the spinous process of the sphenoid bone; passes downwards; winds around the hook of the internal pterygoid process, and is inserted into the soft palate near its mid-

¹ Blandin, Anat. Topographique.

dle, and into the posterior lunated edge of the palate bone. It spreads out, or extends the palate.

The Levator Palati arises from the point of the petrous bone, and passes downwards to be inserted into the soft palate. It draws the soft palate upwards.¹

In the various operations for fissure of the palate, attention to the action of these muscles is essential to a successful result.²

SECTION II.

OPERATIONS UPON THE TONGUE AND THROAT.

The operations practised on the tongue and throat consist in such as are required for the relief of cancer, ranula, or hypertrophy in the tongue, together with those upon the uvula and tonsils.

§ 1.—CANCER OF THE TONGUE.

When the development of cancer in the tongue is of a limited extent, and shows itself as a circumscribed tumor, its removal may be accomplished either by the ligature or by excision.

PRELIMINARY MEASURES.—In order to remove a cancerous tumor, or before attempting any operation upon the tongue, the surgeon will find it necessary to obtain entire control of the member, by inserting into its tip a tenaculum, a needle and ligature, or a pair of hooked forceps; but the former is preferable, both on account of its simplicity and efficiency. In order to employ it, direct the patient to protrude the tongue, and spear the tip of the organ by rapidly passing the point of the tenaculum through its structure, when its motions may be perfectly controlled without creating any very great suffering, and the hand of the assistant holding the instrument will then have this unruly member entirely in its power.

LIGATURES, either of silk or wire, may be resorted to for the removal of cancerous tumors when the disease is slight. When the silk ligature is employed, the base of the tumor should be trans-fixed by a needle armed with a double ligature, and then, on dividing

¹ Horner's Anat., vol. i. p. 490, eighth edition.

² See Staphyloraphy.

PLATE XXII.

OPERATIONS PRACTISED ON THE TONGUE AND TONSILS.

Fig. 1. A front view of the anatomical relations of the parts about the Fauces, as shown with the Mouth widely opened. 1. The dorsum of the tongue as depressed within the teeth. 2, 3. The tonsils *in situ*. 4. The uvula. 5. The anterior half arch. 6. The posterior half arch, with the tonsil between it and 5. 7. The soft palate. After Bernard and Huette.

Fig. 2. A side view of a vertical section of the Mouth and Tongue, showing the anatomical relations of the Vessels and Nerves of the Tongue. 1. The lingual artery. 2. Its sublingual branch. The veins accompany the arteries. 3. The hypoglossal nerve. 4. The ranine vessels as seen near the tip of the tongue. After Bernard and Huette.

Fig. 3. A front view of the Removal of the end of the Tongue as practised either for Cancer or Hypertrophy. 1, 2, 3. The lines of the V-shaped incision. 4. A pair of tumor-shaped forceps (Plate I., Fig. 19) holding the portion to be extirpated, and controlling the tongue until the vessels are ligated. The incision should, therefore, not be carried entirely to 3, until the hemorrhage is checked and the flaps partially united by the application of the first suture. After Bernard and Huette.

Fig. 4. The operation of excising the tongue as shown in Fig. 3. 1. Left hand grasping the flap of the right side. 2. The forceps holding the tip. 3. The right hand of the surgeon. After Bourgery and Jacob.

Fig. 5. The preceding operation as completed. 1, 2. The sutures approximating the two flaps. After Bernard and Huette.

Fig. 6. A three-quarter view of a Hypertrophied Tongue (*Lingua Vitula*), as it existed in Dr. Harris's patient prior to the operation. After Harris.

Fig. 7. A vertical section of the Mouth and Pharynx, to show the excision of the Tonsil by means of the probe-pointed curved bistoury and tumor-forceps. 1. The forceps holding the gland. 2. The bistoury in the act of excising it. Modified from Bernard and Huette.

Fig. 8. A similar view of the parts in the Throat, showing the amputation of the Tonsil by Physick's instrument. 1. The right tonsil, as excised and about to be removed in the instrument. 2. The Tonsilitome of Physick. Modified from Bernard and Huette.

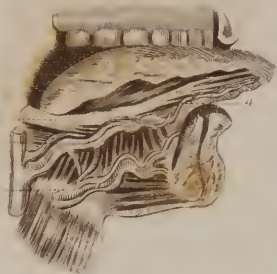


Fig 6

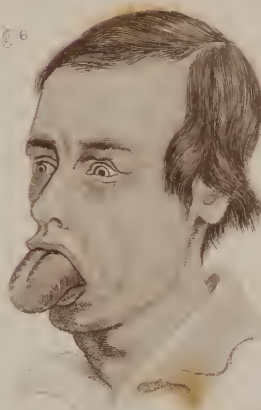
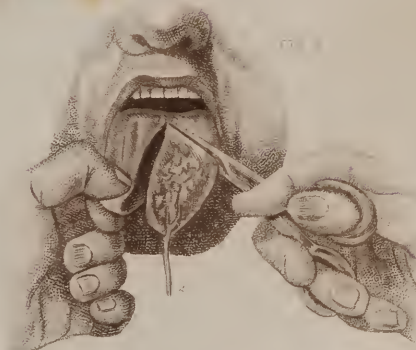


Fig 3



this at its loop, each portion of the tumor may be strangulated by tying the ends firmly around its base. As the tissue to be constricted is extremely dense, it is requisite that the ligature should be drawn very firmly, in order perfectly to strangle the portion included in the loop.

THE DOUBLE CANULA AND WIRE LIGATURE.—When the wire ligature is employed, the double canula of Levret (Plate IV., Fig. 2) should be prepared as directed for polypus of the nose; the motion of the tongue be perfectly controlled by the means just mentioned; a superficial circular incision made around the base of the tumor; a tenaculum passed through the diseased structure so as to elevate it from that portion of the organ in which it is deposited, and then the loop of the wire passed over the tenaculum and carried around the tumor in the incision first made. The wire being then drawn as firmly as possible, should be fastened to the wing of the canula, and the latter left wrapped with linen or tinfoil, protruding at the angle of the mouth nearest to it until sloughing occurs, when the instrument may be removed.

EXTIRPATION.—Excision of these tumors may be accomplished in this as in other cases, by elliptical incisions and dissection, the anterior cuts being made first, in order to prevent the hemorrhage from impairing vision. Subsequently, the wound should be closed by one or more stitches of the interrupted suture.

In more extended cases of disease, amputation or excision of the end of the tongue by a V-shaped incision (Plate XXII., Figs. 3, 4), as mentioned under Hypertrophy, may be required.

§ 2.—HYPERTROPHY OF THE TONGUE.

Under the name of *Lingua Vitula*, authors have described an enlargement of the body of the tongue, which sometimes has been so great as to require the excision of the enlarged portion in order to enable the patient to retract the tongue within the mouth. The operation of Dr. Thomas Harris, of Philadelphia, in 1830, which was the first performed in the United States, was of a marked character.¹ His second operation, in May, 1835, in which I assisted him, was of a similar character, and sufficiently illustrates the ordinary proceeding in such cases.

¹ See Bibliography, p. 76.

AMPUTATION OF THE TONGUE, BY DR. HARRIS.—The patient, aged nineteen, had the tongue enlarged at birth. A short time previous to the operation, it projected beyond the upper incisors three inches; its circumference was six inches, and its vertical thickness one inch and a half (Plate XXII., Fig. 6), and filled up the jaws so completely that it was necessary to have his food cut into small pieces and introduced at the side of the mouth.

OPERATION.—The tongue being elevated, a strong ligature was passed through its tip, so as to control its movements. The under surface was then dissected from the floor of the mouth about three-fourths of an inch behind the anterior part of the jaw, and a strong straight bistoury introduced into the organ at the point where the dissection terminated, whence it was pushed through between the median line and the left ranine artery, and being drawn forward and laterally, was made to cut a flap, which terminated near the first bicuspid tooth. The left ranine artery being then secured with a ligature, the bistoury was again introduced in a corresponding position on the right side, and the opposite or right flap made in a similar manner. The artery of this side being now secured, and the central portion, or space intervening, divided by strong scissors, the incisions or flaps resembled the letter V, and being approximated by three interrupted sutures, made a pointed well-formed tongue of the ordinary length. A year subsequently, the patient articulated distinctly, and was relieved of all deformity.¹

Having had a favorable opportunity of witnessing this operation, I could not but notice the great advantage possessed by the operator from the use of the ligature in the tongue in controlling the motions of this organ; and as but one half of the structure was incised at a time, the hemorrhage was readily controlled by the immediate application of the ligature to the artery. The flaps were then accurately adjusted by sutures without any difficulty.

In a previous case, June, 1829, the same surgeon applied a ligature to the enlarged portion, in order to cause it to slough off, but the irritation was so great that he was subsequently obliged to amputate the end of the tongue with a catlin. In this patient, the tongue protruded beyond the teeth four inches; its circumference was six inches and three-fourths, and its vertical thickness one inch and three-fourths.²

¹ Am. Journ. Med. Sciences, vol. xx. p. 15.

² *Ibid.*, vol. vii. p. 17.

In a case, also congenital, operated on by Dr. H. S. Newman, of Pennsylvania, the enlargement was very great, the portion amputated measuring in length two inches and three-fourths, circumference seven inches and a half, thickness one inch and a half.¹ A reference to the Bibliographical Index, p. 77, will also show the record of the operations of Drs. Warren, of Boston, Mussey, of Cincinnati, Wells, of Columbia, Hayward, of Boston, and Delaney, of the Navy, for the same complaint.

The operations for the relief of tongue-tie, and also that for ranula, will be found among those of minor surgery.²

§ 3.—EXCISION OF THE UVULA.

When, in consequence of chronic inflammation, the mucous membrane of the uvula becomes infiltrated so as to resist the action of astringents, or when it and the azygos uvulæ muscle become relaxed, the end of the uvula is apt to fall upon the edge of the glottis, and produce a cough and irritation of the throat, accompanied by profuse expectoration, and such other natural symptoms of phthisis pulmonalis as have been mistaken for those of this complaint. The effect of this state of the parts, and the mode of relief, were early suggested by the late Dr. Physick, of Philadelphia,³ who also reported a special instrument for the amputation of the elongated portion. Various other surgeons have since then proposed instruments which they deemed advantageous, and calculated to accomplish their object; but it will be found that a pair of dressing forceps to seize the point of the velum pendulum, and scissors or a bistoury to excise it, are all that are necessary.

ORDINARY OPERATION.—Seize the end of the uvula by the forceps held in the left hand, depressing the tongue with the joint of the instrument, or by a spoon in the hands of an assistant. Then, with a pair of scissors hooked at one end like those in Plate XXVI., Fig. 1, or curved on the flat, and held in the right hand, cut entirely through the elongated part, removing the piece in the grasp of the forceps. If the mucous membrane is not cut entirely through at the first clip, or if it escapes from the grasp of the forceps, the frag-

¹ Med. Recorder, vol. vii. p. 541.

² See Smith's Minor Surgery, 3d edition.

³ Am. Journ. Med. Sciences, vol. i. p. 262, 1827.

ment will be apt to fall into the glottis and induce such violent coughing as will render its subsequent excision very difficult. Not more than three-eighths of an inch should be excised, and it is of great consequence to avoid amputating the muscle, as this will materially affect the voice, as before mentioned, and cause the individual to speak in a nasal tone. All that is essential in a primary operation is to cut off the glove-like end of the mucous membrane, and thus give vent to the serum that has elongated it. The subsequent cicatrization will generally accomplish the cure. If it does not, the probability is that the apparent elongation of the uvula will be due to a relaxed condition of the soft palate, and be relieved by stimulating applications, such as painting the parts occasionally with a strong solution of the nitrate of silver, or with the tincture of iodine or tincture of the chloride of iron.

AFTER-TREATMENT.—Nothing more is requisite after this operation, than to gargle the throat several times a day with cold water, and to guard against the use of hot, or highly seasoned, or salt food. Should there be any hemorrhage of consequence, touching the end of the stump with the nitrate of silver will generally arrest it.

§ 4.—EXCISION OF THE TONSILS.

Chronic inflammation of the tonsils, or repeated attacks of quinsy, sometimes cause such effusions of lymph into the parenchymatous structure of these glands as results in induration and permanent enlargement, or in the condition sometimes, though improperly, designated as scirrhus. The continuance of this enlargement being a constant source of irritation, such patients are liable to inflammation of the throat on the slightest change of temperature.

To relieve this sensibility, after the failure of other means, an operation for their removal may become necessary.

OPERATION OF DR. PHYSICK.—In order to accomplish this object without any risk of hemorrhage, Dr. Physick proposed, and practised for some years, the removal of these glands by sloughing, induced by strangulating them with the double canula and wire ligature before referred to.¹ But, in consequence of the pain and inflammation which sometimes ensued, this operation has justly

¹ See Polypi in the Nostril, p. 345.

been supplanted by that of excision. Various instruments have been recommended by different surgeons for this purpose, and for a list of those suggested by surgeons in the United States the reader is referred to the Bibliographical Index, at the commencement of the volume.¹ At present, one of two instruments is most frequently resorted to in this country, viz., that of Dr. Physick, slightly modified by Schiveley (Plate XXVI., Fig. 3), and that of Dr. Fahnestock.

The instrument of Dr. Physick consists of a ring, which surrounds the part to be excised, and of a triangular-shaped knife, which, sliding in the ring, guillotines the gland.

Dr. Fahnestock's instrument is also formed of a ring, but his knife is of a circular shape, and excises the tonsil by drawing it towards the operator. This instrument has justly been objected to, by many who have employed it, from the difficulty of giving a good edge to a circular blade, and also from its tendency to cut by pulling upon the gland rather than by dividing it with the clean incision of a knife. That of Dr. Physick, as modified by Schiveley, having none of these defects, and having its cutting edge of such a shape as will enable the surgeon to preserve or renew it himself, is preferred by others, and has much to recommend it. M. Velpeau prefers the instrument of Fahnestock, but has modified it to some extent; and I have lately seen a further modification by Charriere, in which the knife is only half a ring, and made to cut like a curved bistoury. This is, however, nothing new, a similarly-shaped knife having been suggested and used by Drs. Rogers and Cox, of New York, nearly twenty years since.²

PHYSICK'S OPERATION OF EXCISION.—The patient being seated before a strong light, the head supported against the breast of an assistant, and the thumb of the latter made to press on the external parts just behind the angle of the jaw, so as to render the tonsil prominent in the throat, and force it from between the half arches, the surgeon should introduce the instrument flat upon the tongue, pass it rapidly back to the fauces, turn it on its side, so as to place the tonsil in its ring, transfix it with the needle attached to the instrument, and, pushing the knife backwards, shave off all the portion included in the ring by a movement similar to that of a guillotine. Then removing the instrument, the excised portion will

¹ See Bibliography, p. 78.

² Ibid.

be brought out with it in less time than it takes to describe the steps of the operation (Plate XXII., Fig. 8).

Should this instrument not be at hand, a probe-pointed bistoury and dressing forceps may be made to answer by a skilful manipulator (Plate XXII., Fig. 7), but the proximity of the carotid artery to the outer wall of the pharynx at the seat of the tonsil, should induce the surgeon to be cautious, lest he open it by prolonging his incision to too great a depth.

AFTER-TREATMENT.—The only after-treatment that is requisite is that referred to in excision of the uvula.

REMARKS.—The simplicity of the operation of amputating the tonsil, as performed by the Tonsilitome, is such that it is difficult, at the present time, to realize the anxiety and discussions of the surgeons of the period when amputation of the tonsil was first suggested. The fear of hemorrhage, which was so generally entertained at that period, is now seldom noticed, and out of very many cases upon which I have operated, I can only recall one in which there was sufficient bleeding to demand attention, and this yielded readily to the application of a strong solution of the nitrate of silver. When a tonsil has been indurated for many months, the effused lymph will cause such a constriction of the bloodvessels in the structure of the gland as will diminish their caliber, the limited space in which the tonsil is placed, not permitting any marked distension of the structure, except in the line of the thickening of the gland. It may, however, prove useful to state that under no circumstances is it safe to attempt the excision of a portion of the tonsil, when its structure is acutely inflamed, as the hemorrhage will then be very free.

CHAPTER XII.

RESECTION OF THE BONES OF THE FACE.

THE sawing and removal of a portion of any bone having long been designated by surgeons as a Resection, and being also generally understood to mean the cutting or paring off of any part,¹ it

¹ Webster's Dictionary.

does not seem necessary to change the word Resection to that of Exsection, as has lately been suggested,¹ under the erroneous idea that the term resection means the repetition of a section. As the old nomenclature is entirely correct, the introduction of a new term has nothing to recommend it, and in the subsequent remarks on the operations on the bones, the word "Resection" will be employed, as it has heretofore been almost universally used, to wit, to designate the section of any portion of a bone, whether performed on the first or any subsequent occasion.

SECTION I.

ANATOMY.

The Superior Maxillary bone articulates with the frontal, nasal, and unguiform bones; in front with the os frontis and nasal by its nasal process, by means of a firm regular suture; with the unguiform and ethmoid in the orbit of the eye by simple apposition, and with the malar bone at its anterior external angle by a firm suture. To the pterygoid process of the sphenoid bone at its posterior inferior portion; to its fellow of the opposite side; to the vomer in the middle line of the mouth, and to the palate bones in the same line posteriorly, it is also joined by more or less close adhesions.

The Inferior Maxilla forms the lower outline of the face extending entirely around it from ear to ear. It articulates with the glenoid cavity of the temporal bone just in advance of the external meatus of the ear by means of its condyloid process. This process is a transverse cylindrical ridge directed inwards and slightly backwards, and springs from the ramus of the jaw by a narrow neck. The coronoid process is seated in advance of it, and has the temporal muscle inserted into its point. It is important to notice that both processes are apt to be much enlarged by the tumors or malignant deposits, which sometimes require the resection of the jaw.

The Masseter Muscle, arising from the parts about the zygoma, is inserted into the base of the jaw at its angle. The Muscles forming the floor of the mouth are also attached along the base of the jaw on the inner side of the bone, and it is by this attachment that the tongue mainly maintains its position in advance of the glottis.

¹ Mott's Velpeau, by Townsend.

PLATE XXIII.

INSTRUMENTS EMPLOYED ON THE JAWS AND EAR.

Fig. 1. A three-quarter view of Barton's Dilator for expanding the Jaws, in cases of False Anchylosis. Schiveley's Pattern.

Fig. 2. A view of the Dilator of Jno. Bell, of England. The screw causes the blades to separate. After Bell.

Fig. 3. A strong Scalpel, with a Raspatory at one end of the handle, applicable to all bone operations. Schiveley's Pattern.

Figs. 4, 5. Strong double-edged curved Scalpels for the same purpose.

Schiveley's Pattern.

Figs. 6, 7. Strong Knives or Scrapers for excising Carious or other diseased Bones. Charriere's Pattern.

Fig. 8. A pair of Hawk-bill Scissors, useful in dividing the middle palate suture in Resection of the Upper Jaw. The probe-pointed end is to be passed into the nostril and the other blade made to cut from the mouth upwards. This instrument is similar to that used by gardeners for lopping trees, and is the best kind of bone-nippers I ever employed.

Schiveley's Pattern.

Fig. 9. Horner's Triangular Vertical-Bladed Knife for dividing the transverse portion of the palate in Resection of the Upper Jaw.

Schiveley's Pattern.

Fig. 10. Itard's Ear Speculum.

After Bernard and Huette.

Fig. 11. Bonafond's Ear Speculum.

" "

Fig. 12. Itard's Catheter for the Eustachian Tube.

" "

Fig. 13. Blanchet's " " "

" "

Fig. 14. Dupuytren's Forceps for Aural Polypi.

" "

Fig. 15. Fabrizi's Forceps for the removal of Foreign Bodies from the Ear.

" "

Fig. 16. A Curette for the same purpose.

" "

Fig. 17. Horner's Knife for perforating the Membrana Tympani.

Schiveley's Pattern.

Figs. 18, 19. Deleau's Instrument for perforating the Tympanum. In one the perforator is concealed, in the other protruded from its sheath.

Charriere's Pattern.

Fig. 20. Homer's Syringe for washing out either the external or middle Ear either with air or water.

Schiveley's Pattern.

Fig. 21. The Nozzle of Fig. 20 passed through a cork, so as to plug up the external meatus when injecting the middle ear. From the Instrument.

Fig. 22. A Caoutchouc Bottle for washing out the Ear.

Charriere's Pattern.

Fig. 23. Horner's Portable Air-Chamber for Injecting the Ear. 1. The air-pump. 2. The tin chamber. 3. A cock which keeps the air in the chamber when charged. The opening of this tube being applied to the catheter and the cock turned, the current of air will pass, as regulated by the cock. From the Instrument.

Fig 1



Fig 2

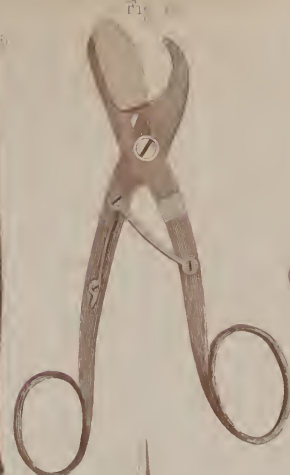


Fig 3

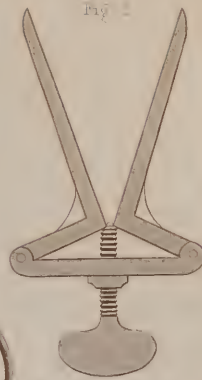


Fig 4



Fig 5



Fig 6



Fig 7



Fig 22



Fig 23



Fig 17



Fig 1



Fig 14



Fig 10



Fig 11



Fig 16



Fig 18



Fig 20



Fig 21



Fig 15



Fig 19



Fig 13



Fig 12



Fig 24



When these attachments are divided, the tongue may be drawn in upon the glottis, and induce suffocation unless artificial means are employed to prevent it, though it is not always the case, the connection of the sterno-hyoid muscles with the hyoid bone having a tendency to counteract the action of the styloid muscles, which are those that mainly induce it. The Carotid artery, in its connections with the parotid gland, is found near the angle of the jaw, but, by drawing the bone well forwards and downwards, this artery will be separated to some extent from the bone, in consequence of the posterior adhesions of the parotid.

SECTION II.

OPERATIONS UPON THE JAW BONES.

§ 1.—RESECTION OF THE UPPER JAW BONE.

The development in the bones of the face of tumors of a malignant character, and their encroachment on the surrounding structures, has sometimes created such a condition as has rendered it desirable to remove either a portion, or the entire structure of the bones which constitute the basis of this region. As the jaw bones are generally deemed to be essential to speech as well as mastication, it would appear, at first sight, as if their removal would necessarily impair the nutrition, and also the usefulness of the patient, whilst their close proximity to large bloodvessels and important nerves, indicates the necessity of great caution in any extended operations that might be practised upon them. Such appears to have been the views formerly entertained by surgeons, respecting the practicability of resorting to resections of these bones entire; and we accordingly find that the earlier operations were either of a limited character, or only performed after every possible precaution had been taken to guard against hemorrhage, either by preparing cauterizing irons, or by ligating the main trunk of the carotids previous to the operation. The condition of patients who had suffered from extensive gunshot wounds of this region, having shown, however, that a much greater amount of the face could be removed without loss of life than had been supposed, surgeons gradually extended their efforts to relieve the diseases of these

parts until they have at last succeeded in removing the entire upper jaw of each side, and taken away all the lower jaw from its articulations forward.

In reviewing the records of these operations, we find that Aeoluthus, a surgeon of Breslau, first removed a portion of the upper jaw for a tumor, he having operated as early as 1693; that Jourdan also removed a part of the antrum Highmorianum for the relief of a tumor in May 1768, and that Dupuytren resected a considerable portion of the alveolar cavities of the bone in 1819. These operations, though among the earliest of those recorded, did not reach the extent of a resection of either the entire body, or even half of the bone; and it may, therefore, be justly said that the most extensive and daring resection of either of the bones of the jaws were first performed by American surgeons; that of Dr. Jameson, of Baltimore, upon the upper jaw, having been executed in 1820,¹ and that of Dr. Deaderick, of Kentucky,² upon the lower jaw, performed in 1810.

One of these operations (Deaderick's) was also performed nearly ten years prior to the operation of Dupuytren, whilst the other (Jameson's) was so near the same period as to leave no time for any communication of the event to this country. I have, therefore, no hesitation in claiming for American surgeons the credit of having been the first to illustrate the feasibility of these extensive resections.

The first resection practised upon the bones constituting the upper jaw, was performed in the United States for the removal of a tumor from the antrum by Dr. Horatio G. Jameson, in November, 1820.³ From an inspection of the drawing which accompanied this case, as well as from its history, it is evident that this resection embraced nearly the entire body of one superior maxilla, although the roof of the antrum, or floor of the orbit, which was not diseased, was allowed to remain.

The operation of resecting the superior maxillary bone of one side having been thus commenced, the resection was soon after (1824) carried yet further by Dr. David L. Rogers, of New York, who successfully removed nearly the entire upper jaw, that is, both superior maxillæ as far back as the posterior external portion adjacent to the pterygoid processes.⁴ Mr. Lizars, who was the

¹ Am. Med. Record, vol. iv. p. 222, 1820.

² *Ibid.*, vol. vi. p. 516, 1823.

³ *Ibid.*, vol. iv. p. 222, 1820.

⁴ Bibliography, p. 70.

earliest of the British surgeons that resorted to this resection, did not operate until 1827, and Gensoul, of France, whose subsequent proceedings have so intimately associated his name with the operation, did not attempt it until about the same year. Since 1827, the operation has been very frequently performed in the United States—Dr. A. H. Stevens, of New York, in 1840, having successfully extirpated the entire superior maxillary and malar bones with portions of the ethmoid and sphenoid of one side; Drs. R. D. Mussey, of Cincinnati, and John C. Warren, of Boston, having also successfully removed the upper jaw in 1842, and Gross, of Kentucky, doing the same in 1843. A reference to the Bibliography¹ will also show that since this period, many other American surgeons have been equally successful; so that this once doubtful operation, may be now considered as permanently established. The result of the operation, as shown by an analysis of many of those performed in Europe since 1820, also indicates that an equally successful result has been obtained elsewhere, Ried² (*Die Resectionem der Knochen*) having collected thirty-five cases, in twenty-four of which the patients were reported as cured—meaning, probably, cured as to the operation, though not preserved from a return of the disease when the tumor was malignant.

As characteristic of the method usually pursued in this operation, the following one, performed by Dr. Warren, may be first referred to:—

OPERATION OF DR. WARREN.—The patient being seated with his head well supported, an incision was made through the cheek down to the bone, from the middle of the external edge of the left orbit, to the left angle of the mouth, and was followed by a copious gush of blood. The internal or nasal flap being then quickly dissected forwards to the middle of the nose, the attachment of the cartilage of the left alæ of the nose was cut off, thus freeing the eyeball from the inferior part of the orbit, by dividing the inferior oblique muscle, the fascia of the eye, and the periosteum. The outer or lower flap was next rapidly dissected from the os malæ and superior maxilla, and around the latter bone as far as its union with the pterygoid process of the sphenoid; but the uniting space was not penetrated at this time, on account of the large pterygoid branch of the internal maxillary, which it would have been difficult to secure at this stage of the operation.

¹ Bibliography, p. 70.

² Med. Examiner, vol. ix. p. 595.

PLATE XXIV.

A VIEW OF THE ANATOMY OF THE SIDE OF THE FACE, AND OF SOME OF THE OPERATIONS PRACTISED ON IT.

Fig. 1. A side view of the Anatomy of the Face after the removal of the integuments. 1. The shape and position of the parotid gland. 2. The duct of Steno. 3. The sublingual gland. 4. The facial artery, at the point where it passes on to the face. 5. The facial vein. 6. The sterno-cleido-mastoid muscle. 7. The external jugular vein. 8. The zygomatic muscle. 9. Branches of the portio dura nerve emerging from the upper edge of the parotid; other branches are seen on the face.

After Bernard and Huette.

Fig. 2. The same Section after the removal of the Parotid Gland. 1. The portio dura nerve at its exit from the stylo-mastoid foramen. 2. The duct of Steno divided transversely. 3. The external carotid artery when freed from the parotid. 4. The temporal artery. 5. The facial artery after removal of the sublingual gland. 6. The sterno-cleido muscle. 7. Main trunk of the external jugular vein. After Bernard and Huette.

Fig. 3. A three-quarter view of Horner's operation for the cure of Salivary Fistula. A wooden spatula supports the inside of the cheek; a slight longitudinal incision is made at the external fistulous orifice, and the hand of the surgeon is seen pressing the punch against the spatula so as to cut out a piece through the cheek. The external incision, being closed by a point of a suture, heals usually by the first intention, leaving the orifice, made by the punch, open in the mouth.

Drawn from Nature.

Fig. 4. A view of the operation of Resection of the Upper Jaw, as practised by the incision of Dr. Warren. 1, 2, 3. The flaps everted, and turned over the nose and eye so as to expose the bone. The left hand of the surgeon is holding, 4, the bone at the moment of disarticulation by the knife, 5, which is working at the pterygo-maxillary fissure. Velpeau's operation is nearly the same as that of Dr. Warren.

After Bernard and Huette.

Fig. 5. Represents the completion of the operation, the union of the wound by the twisted suture, and the line of the cicatrix, which extends from the malar bone to the mouth near, but not at the angle.

After Bernard and Huette.

Fig. 6. A view of the termination of Gensoul's operation, showing the lines of his incision. 1, 2. The first incision across the tumor. 3, 4. The second incision. 1, 5. The third incision, forming flaps which are to be turned up and down upon the face. The sutures are seen as placed at the termination of the operation.

After Gensoul.

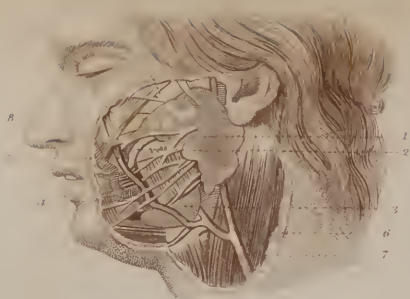


Fig. 1

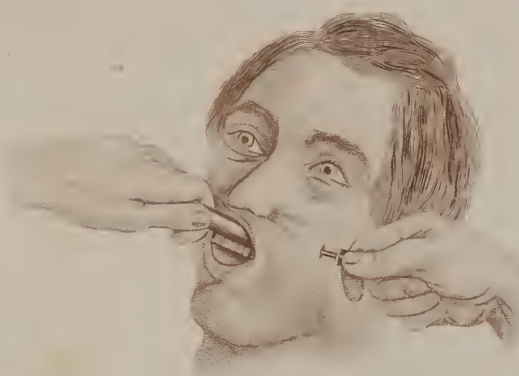
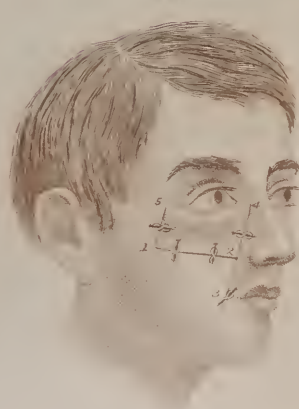
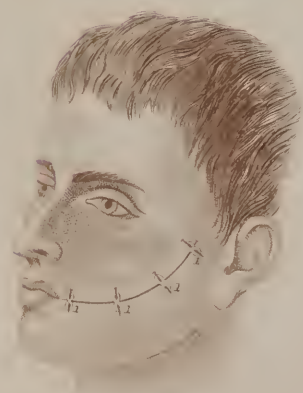


Fig. 2



The two flaps being separated, the anterior extremity of the speno-maxillary fissure was perforated, and the cutting forceps applied to the broadest part of the os malæ directly opposite to the perforation, by which it was smoothly divided in a few seconds.

The same instrument was then applied at the internal angle of the eye in an oblique direction from the lower edge of the orbit, to the lower termination of the os nasi, and the bone divided without difficulty.

In the mean time, the blood flowed in torrents; one large artery required immediate ligature, but the bleeding of the others was controlled by compression of the carotid artery. The mouth of the patient filling with blood, frequent pauses were required to afford him an opportunity of ejecting it, and occasionally he was recruited with a little wine.

The most difficult part of the operation remained, that of dividing the sound from the diseased parts within the mouth, and separating the maxillary from the sphenoid and palate bones without injuring the latter, so as to leave the patient the whole of the soft palate, with the palatine plate of the os palati to support it.

In order to accomplish this without dissection, an incision was made through the mucous membrane of the hard palate, beginning at the edge of the palatine plate of the os palati, and extending forwards to the front edge of the jaw, and then upwards across the alveoli into the bone. To facilitate this incision, the central incisor within the left side was extracted so as to break the anterior part of the alveolus. Then, by a single stroke of the cutting forceps, the upper maxillary was separated from its fellow, and its palate plate cut through as far as its junction with the os palati. In order to separate the palatine plates of the maxillary and palate bones, the forefinger of the left hand was passed into the mouth to the last molar tooth, and its pulp turned forwards to receive and support the cutting instruments, the flow of blood preventing anything being seen. A strong pointed knife was then stuck through the hard palate at the union of the maxillary and palate bones, so as to separate them, and also free the maxillary from the pterygoid process of the sphenoid, thus accomplishing the disunion of all the bones concerned.

Finally, the knife was passed externally behind the upper maxillary bone into the space between this and the pterygoid process, and seizing the bone with the left hand by its orbital and alveolar por-

tions, it was, by a gradual movement, started from its situation (Plate XXIV., Fig. 4), and, aided by a few touches of the knife, freed from its remaining periosteal attachments. The hemorrhage was arrested by ligatures and lint. Eight weeks afterwards, the patient went home, and three months from that time continued well.¹

Dr. WILLIAM E. HORNER, in a case of scirrhus of the antrum, succeeded in removing the whole of the upper jaw *without any external incision*, thus saving the patient the scar in the face. The removal of a considerable portion of the same bone was also successfully performed by Dr. A. H. Stevens, of New York, in 1823, and published in the *New York Journal of Medicine and Surgery* for 1849. The publication of the case having been delayed for several years, from motives of delicacy to the patient, who was widely known, Dr. Stevens has not received that general credit to which his ingenuity entitled him. Dr. Horner was ignorant of Dr. Stevens's success at the time of his operation.

REMOVAL OF THE SUPERIOR MAXILLARY BONE WITHOUT ANY EXTERNAL INCISION IN THE CHEEK.—Dr. HORNER having determined to avoid cutting through the cheek, as commonly practised, the patient was seated in a chair, with his head well supported, and partially etherized. The assistant, supporting the patient's head, then raised the angle of the mouth on the left side, and held it widely open, whilst the upper lip and cheek were dissected from the superior maxilla as far back as possible, in a line parallel with the superior margin of the buccinator muscle. The two incisor teeth on the left side being then drawn, the corresponding alveoli were cut through in the middle line by a narrow saw (Plate V., Fig. 7), which worked its way from the mouth into the left nostril; then a pair of strong hawk-bill scissors (Plate XXIII., Fig. 8), such as are used by gardeners for lopping off twigs, took out the two vacated alveoli at a clip.

A thin, flat, well-tempered knife, with a strong round handle (Plate XXIII., Fig. 5), was now struck through the roof of the mouth into the nose, at the junction of the palatine processes of the palate and superior maxillary bones (posterior middle palate suture), so as to cut forwards and separate the maxillary bones from each other in the middle. When the narrow saw was again used to cut through the root of the nasal process of the maxillary bone, and

¹ Boston Med. and Surg. Journ., vol. xxvi. p. 9, 1842.

strong scissors, curved on the flat, made to cut through the orbital plate at its margin, the incision being carried back to the pterygoid process of the sphenoid, around and below the malar bone.

The base of the soft palate being then detached by a short triangular knife (Plate XXIII., Fig. 9), curved on the flat, so as to leave the soft palate attached to the palate bone, a few touches of the knife freed the remaining attachments.

The pterygoid process, malar bone, and the orbital plate of the upper maxillary were, however, not disturbed, but left. The tumor, besides its bony connection, was also attached to the posterior part of the cheek, and to the external pterygoid muscle. The gouge and scissors, however, sufficed to remove every part that could be detected.

The bleeding was profuse, especially from what was believed to be the posterior palatine artery; but the vessel was readily secured by means of a ligature and Physick's needle; and a few other ligatures, with charpie, arrested the remainder of the hemorrhage. The drawing (Plate XXV., Fig. 1) shows the appearance of the mouth immediately after the removal of the bone, though representing it on the right instead of the left side of the face, in consequence of its being daguerretyped, this peculiarity having been overlooked by the engraver. The amount of the jaw which was removed in this operation is accurately shown in Plate XXV., Fig. 2.

The additional time required for this mode of operating is probably fifteen or twenty minutes; but it saves the patient a scar for life.¹

Three years afterwards, the patient presented no appearance of the return of the tumor; and his daguerreotype (Plate XXV., Fig. 3) shows the small amount of deformity. I have recently seen this gentleman, and he is now² engaged in the study of medicine, and in the enjoyment of excellent health.

Dr. STEVENS, of New York, in August, 1823, extirpated a fungus from the antrum maxillare, and removed a considerable portion of the bone, also, without any external incision.

OPERATION OF DR. STEVENS, OF NEW YORK.—The second incisor and the last molar tooth but one, being first extracted, the upper lip was dissected off from the jaw as high as the infra-orbital foramen. The bone being then bored through by means of a trocar, which was carried backwards and downwards till it perforated the palatine

¹ Med. Examiner, No. 1, p. 16, 1850.

² 1854.

membrane near the junction of the left os palati with the palatine process of the left superior maxilla, the palatine membrane was incised from this point to the external edge of the first left incisor tooth. The palatine process of the superior maxilla was next divided by a saw, with its teeth directed downwards, passed through the route made by the trocar; and the bone, both above and below, between the socket of the last molar tooth and the perforations of the trocar, was also divided by a fine flexible saw, seven inches long, made of watch-spring, and having teeth only in its middle for the extent of three inches, the division being made in the direction of a curved line, which extended from the point where the trocar first entered to the alveolar cavity of the molar tooth extracted. No bad symptom followed, and in six months the opening in the antrum was completely closed.

The patient, seven years subsequently, was in perfect health.¹

Dr. MOTT, in an operation for a large polypus of the nose, was compelled to make a partial section of the upper jaw, by an incision through the integuments from below the internal canthus, down the side of the nose, and through the upper lip about three lines from the angle of the mouth. Then, dissecting back the two flaps thus made, he divided the necessary portion of the bone with a saw.²

REMARKS.—It will be found to be a matter of some consequence, in these resections of the upper jaw, to leave the os unguis and the superior extremity of the nasal process of the superior maxillary bone untouched, in order to preserve the lachrymal sac from injury. When attention is not given to the preservation of this sac and its duct, the patient will be liable to a constant cedematous condition of the lower lid, and suffer also from stillicidium lachrymæ. If the orbital plate can also be left, it will diminish the deformity.

In tumors requiring the entire amputation of the jaw, the incision of Dr. Mott will be found to expose the bone freely, and may be advantageously resorted to; and in the case of a very large tumor, whose removal would be impracticable by the plan of Dr. Horner, this incision would probably open the parts sufficiently, and yet create a scar that would hardly be noticed.³

In a valuable paper by Dr. Gross, of Louisville,⁴ will be found

¹ Velpeau's Surgical Anatomy. Appendix, by John W. Sterling, M. D., vol. ii. p. 518, New York, 1830.

² Velpeau's Surgery, by Mott, p. 907.

³ See Bibliography, p. 70.

⁴ Western Journ. Med. and Surg., vol. x. 3d series, p. 185. On Excision of the Superior Maxillary Bone, illustrated by Seven Cases.

some practical remarks on various points connected with this operation, which may now be advantageously referred to in connection with the different methods of operating.

POSITION OF THE PATIENT.—Dr. Gross prefers that the patient should be placed in the *recumbent* position, with a broad and rather thin pillow under the head and shoulders, and with the face inclined to the sound side.

ANÆSTHESIA.—Anæsthetics he considers decidedly useful, and has seen no reason for apprehension in consequence of the flow of blood into the mouth when employing them in operations upon this region. He also expresses his satisfaction with their use in every kind of operations upon the mouth that has come under his observation, especially when, as in resections of the jaw, proper care is taken to compress the vessels as soon as they are divided.

HEMORRHAGE.—In no instance, either in the upper or lower jaw, has he found it necessary to secure the carotid artery, or even compress it, the chief danger being from the subcutaneous arteries rather than from the larger trunks. In operating for resection of the bones of the face, he rarely stops to tie a vessel, as experience has taught him that there is, in general, no necessity for this course. The deep-seated arteries have seldom bled much when care has been taken to keep beyond the limits of the diseased structure; but, if this precaution is neglected, the hemorrhage may be copious. The oozing after the resection of the bone has also generally ceased by exposure to the air, or by compression of the bleeding surface with lint wet with strong alum-water.

INCISIONS.—The extent and number of the incisions through the soft parts requisite for the removal of tumors of the jaws, must necessarily vary, but when the morbid growth is comparatively limited, or seated anteriorly, Dr. Gross is of the opinion that external incisions may be dispensed with. In other cases, he prefers one long curvilinear incision, with its convexity downwards, so made that it may extend across the most prominent part of the tumor, from the angle of the mouth to the zygomatic process of the malar bone, and terminate within a few lines of the external angle of the eye. Generally he has found this incision sufficient to expose the disease when the two flaps are dissected off; but, if not, it may easily be increased by a horizontal cut along the inferior edge of the orbit.

DIVISION OF THE BONE.—In dividing the bony structure, Dr.

Gross generally employs a saw, three inches long, eight lines wide, a little rounded off at the end, with sharp, wide-set teeth, and a stout handle, as he deems it preferable to the bone-nippers; he also prefers the use of the chisel, lenticular and bone scalpel to any other instruments that have been suggested for cutting away smaller portions of the bone. The following case is cited as characteristic of his method of operating:—

OPERATION OF DR. GROSS, OF LOUISVILLE.—The canine and the last molar tooth being extracted, the patient was placed upon a table, with her head resting on a pillow, and fully etherized. An incision being then made over the most prominent portion of the tumor, from the angle of the mouth to within a short distance of the external canthus of the eye, in a slightly curvilinear direction, and with the convexity downwards, the flaps were dissected off, and the saw applied to the anterior and lateral part of the jaw, from whence it was carried obliquely backwards through the raphè, to a little beyond the juncture of the maxilla with the palate bone (transverse palate suture). The nasal process of the superior maxilla being next divided with the saw and nippers, nearly on a level with the edge of the orbit, the malar process, and part of the horizontal plate of the palate bone, were cut through, when, having thus severed the most important bony connections, the tumor was wrenched from its bed with the hand and chisel, and the bottom and side of the chasm cleared of everything that had the slightest appearance of disease. The oozing of the blood, which was free, having soon ceased spontaneously, the cavity was filled with lint wet with alum-water, and the wound closed by fine harelip sutures. No arteries, except a small muscular branch, required the ligature. On the fourth day, the sutures were removed, and the external wound found to be healed by the first intention. The lint from inside the mouth being removed as soon as suppuration began, was replaced daily for a week, when it was discontinued. The chloride of lime in solution was also freely used as a detergent with great comfort, and the face was ultimately but slightly disfigured.¹

¹ Western Journ. Med. and Surg., vol. x. 3d series, p. 213.

§ 2.—RESECTION OF BOTH SUPERIOR MAXILLÆ.

Resection of both superior maxillary bones, which was first attempted by Dr. David L. Rogers, of New York,¹ in 1824, was repeated by Heyfelder, in 1844, and again in January, 1850, both operations succeeding, though the disease had reappeared in one case at the last account. It has also been lately performed, unsuccessfully, by Maisonneuve, of Paris, on a man sixty-nine years of age, who suffered from cancer of these bones, and, successfully, upon a young girl affected with necrosis from the vapor of phosphorus, or as one account says polypus. The first case was operated on as follows:—

MAISONNEUVE'S OPERATION FOR RESECTION OF BOTH SUPERIOR MAXILLÆ.—A vertical incision being made in the middle line, so as to divide the nose from its root, and terminate in the upper lip, a transverse incision was made from the internal angle of the right to that of the left eye, leaving two large quadrilateral flaps, which were dissected along the edges of the orbit to the external angle on each side. These flaps being inverted, the disease was exposed. One end of a chain-saw being then passed by its needle through the speno-maxillary fissure, and the other through the root of the nose, so as to traverse the os unguis of each side, the bones were detached laterally and superiorly, the velum palati freed transversely and posteriorly by a bistoury, and the entire mass of the bones detached by the help of Liston's forceps.²

HEYFELDER'S OPERATION.³—Both the superior maxillæ being involved in a malignant tumor, an operation for their removal was performed as follows:—

The patient being seated in a chair, with his head supported against the breast of an assistant, an incision was made on each side of the face, from the external angle of the eye to the labial commissure, and the included parts reflected upwards towards the internal angles of the eyes, the nasal bones, and also towards the forehead, until the infra-orbital ridge was exposed. The chain-saw of Jeffrey being then passed through the speno-maxillary fissures, the malar

¹ See Bibliography, art. Upper Jaw, p. 69; also Velpeau, Méd. Opérat., tom. ii. p. 628.

² New York Journ., vol. v. N. S. from Med. Gaz.

³ Med. Examiner, vol. ix. N. S. p. 595, from Rev. Méd.-Chir., Paris.

bones were divided, the maxillæ separated from the ossa nasi, and the vomer and the thinner bones cut with strong scissors, when the application of the chisel to the upper part of the tumor was sufficient to effect its separation by the employment of slight force. Very little blood was lost, torsion and compression sufficing to arrest the hemorrhage. Two hours afterwards, the edges of the wounds, from the angles of the eyes to the corners of the mouth, being united by twenty-six points of the interrupted suture, cold lotions were applied; there was no reaction or swelling, and the patient could swallow water and broth. Four days subsequently, the wounds had nearly healed by the first intention, and in six weeks the patient was exhibited to the Medical Society of Erlachen. At this time there was no deformity of the features; a fissure, thirteen lines long and three lines wide, was seen along the median line in his mouth; the soft palate and uvula were in their natural place; deglutition was free; the nose had resumed its usual form and direction, and the face, which, before the operation, was like that of a monkey, again possessed a human expression; a firm and solid tissue replaced the extirpated parts.

REMARKS.—In resection of the upper jaw, as in all other surgical operations, the circumstances of the case exert so great an influence on the decision of the means to be employed, that an estimate of their value must necessarily be only an approximation. Where the tumor will permit it, there is, however, no question that the operation of Dr. Horner, for the removal of the bone without an external incision, is the best for the patient, as it preserves the functions of the portio-dura nerve, saves him a most unsightly scar, and, when the cheek can be freely dissected off from the surface of the tumor, exposes the part with considerable freedom. But if the development of the disease requires a more free opening of the integuments, in order to afford space for acting in the various steps of the disarticulation, then the simple curved incision from the outside of the malar bone to near the angle of the mouth, so as to avoid the main trunk of the portio dura, as practised by Drs. Warren and Mussey, and subsequently by Velpeau, or the vertical cut of Dr. Mott, will probably answer better; but it is always advisable to make these incisions terminate near and not precisely at the angle of the lips, as the cicatrix, from its stiffness, is then less apt to interfere with the expansion or contraction of the mouth, and consequently with the expression of the face when the patient is engaged in conversation. In all external incisions, and espe-

cially those near the masseter muscle, the operator should bear in mind the position of the duct of Steno, and so arrange his incisions and dissections as to leave it uninjured in the lower flap of the integuments. Whenever the disease has not encroached upon the orbit, it is also desirable to leave the orbital plate for the support of the eyeball. But as this can seldom be told unless by opening the front of the antrum and removing the mass of the tumor, at the commencement of the operation, the proceeding will, in many cases, prove dangerous from the hemorrhage that it will induce.

STATISTICS OF RESECTION OF THE UPPER JAW.—Resection of the superior maxilla has been twice performed by Dr. Jno. C. Warren; one patient being cured, and the other lost; the same surgeon has also performed partial resection many times with perfect success.¹ By a reference to the Bibliographical Index, p. 69, it will also be seen that the cases as reported by Drs. Jameson, Rogers, Warren, Mussey, Stevens, Mott, Eve, Horner, Gross, and other American surgeons, have often been followed by a successful result. From an analysis of these cases, we have the following facts:—

Of eighteen cases reported, ten were cured and eight died, or nearly three-fourths were cured, that is, the patients were doing well at periods varying from six weeks to five years after the operation. But, to prevent misapprehension in relation to the effects of this operation upon the disease, I would state that several of those above reported as cured, are so referred to by the operators solely in connection with the results of the operation, some of them being expressly mentioned as dying subsequently of the disease. In prognosticating the result of the operation, it should therefore be remembered that, though its happy termination is more marked than that of other great operations (nearly three-fourths recovering), yet the tendency to ultimate death from the disease is but slightly diminished by removing it from the point in which it was first apparent. According to the experience of Dr. Gross,² it may be anticipated that in every instance of encephaloid tumor the disease will return, no matter how thoroughly the abnormal structure has been extirpated, but that in the fibrous or other non-malignant tumors there is no reason to apprehend a relapse. The results of Mr. Ried's examination of the history of this operation also shows that out of thirty-five cases treated in Europe, there were twenty-four cured.

¹ Manuscript of Dr. Warren.

² West. Journ. Med. and Surg., vol. x. 3d series.

PLATE XXV.

RESECTIONS OF THE UPPER AND LOWER JAW.

Fig. 1. A view of the inside of the Mouth immediately after the removal of the left superior maxillary, as performed by Horner, without any external incision in the cheek. The soft palate is shown as preserved, but the engraving has reversed the side from which the bone was taken, making it appear as if performed on the right side. After Nature.

Fig. 2. A side view of the portion of bone removed from the mouth. “ “

Fig. 3. A likeness of the patient three years after the operation. “ “

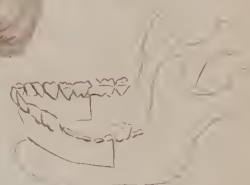
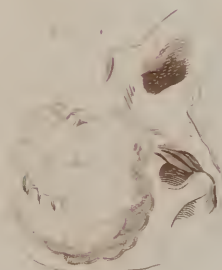
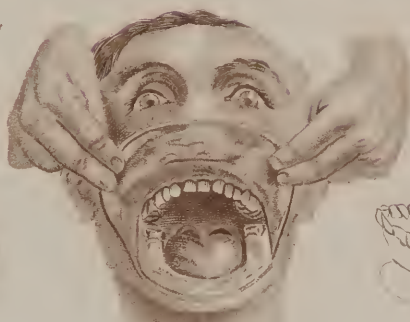
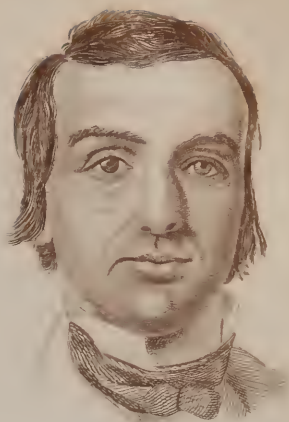
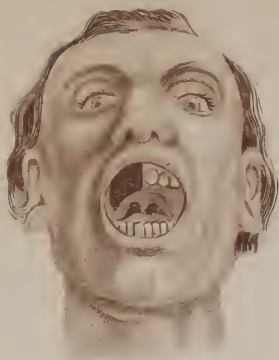
Fig. 4. An outline of a Skull, showing the relative size and position of the Tumor in Dr. Barton's patient. After Barton.

Fig. 5. An outline of an Inferior Maxilla, showing the line of incision in the Jaw. “ “

Fig. 6. A front view of Barton's operation for Resection of the Lower Jaw without destroying its base, thus preserving the outline of the Face. In the original operation, the lower lip was divided vertically at its left angle, but this has not been done in the drawing, in consequence of its not being universally necessary. When the tumor permits it, the simple horizontal cut in the integuments, as shown in the figure, brings the cicatrix under the chin, where it is hardly perceptible. After Nature.

Fig. 7. A side view of Lisfrane's operation for Resection and Disarticulation of half of the Lower Jaw, at the moment of removal, the jaw being everted and drawn forwards and downwards in order to avoid any injury to the artery at this point. After Bernard and Huette.

Fig. 8. A front view of the Resection of the Chin or middle portion of the Inferior Maxilla, as practised by Dupuytren. A vertical incision in the median line of the chin enables the operator to turn back two flaps, 1, 2, and expose the bone, which may then be readily divided by Hey's saw, if it is desirable to cut from before backwards, or by the chain saw passed around the bone and made to cut from behind forwards. The latter is preferable, in most instances. After Bernard and Huette.



§ 3.—RESECTION OF THE INFERIOR MAXILLA.

The Inferior Maxilla may be resected either partially or entire, the former having been performed by Dr. W. H. Deaderick, of Rogersville (now of Athens), Tennessee, in Feb. 1810, and subsequently by Dr. Mott, of New York, in 1821, and the latter having been successfully performed by Dr. George McClellan, of Philadelphia, who, in 1823,¹ removed all the bone, anterior to its angles, and was the first surgeon who attempted so extended a resection of this portion of the face. Walther, of Bonn, and Græfe, of Berlin, have since then resected and also disarticulated the entire bone, and Dr. Carnochan, of New York, has lately repeated the operation in order to relieve a patient who was suffering from an extensive necrosis. Professor Ackley, of Cleveland, Ohio, is also reported² to have succeeded, in July, 1850, in removing the bone *entire*, in a case of osteo-sarcoma, the patient being alive and in good health two years subsequently. The partial resection of the jaw has now been so often accomplished as to render it difficult to register all the cases.³

Whether the evils resulting from the loss of the entire lower jaw bone are not such as will forbid its repetition, is at present a question that experience has not settled. They should, however, be deliberately considered by every surgeon before attempting the operation, the difficulties of accomplishing the operation not being so great as the evils likely to ensue to the patient on its completion.

I. RESECTION OF ONE SIDE OF THE INFERIOR MAXILLA.

OPERATION OF DR. DEADERICK.—An incision was commenced under the zygomatic process, and continued over the tumor (which almost entirely enveloped the left portion of the jaw, and occupied nearly the whole mouth) in the direction of the bone, to nearly an inch beyond the centre of the chin. A second incision was then begun about midway and at right angles with the first, extending a short distance down the neck. The integuments being now separated from their connection with the tumor, and the jaw sawed

¹ Am. Med. Review, vol. ii. p. 153, 1825. Also, Cooper's First Lines, p. 16, edited by Samuel McClellan, Philadelphia, 1830.

² N. Y. Journ. Med., vol. x. N. S. p. 288, 1853. Also Dr. S. S. Purple, in MS.

³ See Bibliography—article Lower Jaw, p. 72.

through near its angle, as well as at the centre of the chin, there was no difficulty in freeing it from its other attachments. The wound was then closed in the usual manner, and the boy had a speedy and happy recovery. Thirteen years subsequently, there was no connecting medium between the ends of the divided bone.¹ The description of the tumor shows it to have been osteo-sarcoma.

REMARKS.—As the account of this operation was not published by Dr. Deaderick until nearly one year after Dr. Mott's operation,² and as the latter surgeon had performed his operation before he heard of that of Dr. Deaderick, the credit of priority has been strongly urged, and by many accorded to the latter gentleman. But, as the case of Dr. Deaderick, though not published until 1823, contains the evidence of those who know it to have been performed in 1810, justice would seem to demand that Dr. Deaderick should obtain the renown which has been so frequently attached to those who only followed in his footsteps, especially as claims to the credit of originating the operation have been advanced in Europe both by the English and French surgeons. The decision of the priority of the operation of Deaderick is now generally received in the United States as correct, though there are yet some European surgeons who assign the credit of the first operation to Dupuytren in 1812. It is, however, but just to state, in connection with the varying claims of Drs. Mott and Deaderick to the originality of their operations, that the operation of Dr. Deaderick was a resection of a portion of the jaw, the ramus of the same side being left, whilst that of Dr. Mott was the resection of the entire half of the bone, and necessitated a disarticulation at the temporo-maxillary joint. Though the credit of the first resection of this bone therefore belongs to Dr. Deaderick, Dr. Mott was certainly the first American or European surgeon who whilst resecting also disarticulated half of the lower jaw.

In the early operations performed by Dr. Mott, it was deemed essential to success to ligate the carotid artery a few days prior to removing the bone; but many cases, since operated on by others, as well as that of Dr. Deaderick, have proved that this step is only a complication of the proceeding; it is therefore now seldom resorted to.

¹ Amer. Med. Recorder, vol. vi. p. 516. Philadelphia, 1823.

² Bibliography, p. 72.

Dr. WM. GIBSON, in a late operation before the medical class of the University of Pennsylvania (Jan. 1851), removed the entire half of the jaw, without tying any vessels of consequence; and if the bone is drawn well forwards previous to attempting its disarticulation, and the knife is made to shave off the soft parts close to the angle and ascending ramus of the jaw, it will be found that there is really very little risk of injuring this vessel, as the artery, by remaining *in situ*, is removed several lines from the dissections required for the disarticulation of the bone.

ORDINARY OPERATION FOR RESECTION AND DISARTICULATION OF HALF OF THE JAW.—The patient being seated on a chair, so that his feet will not touch the ground and enable him to tilt himself backwards, and having his head supported by an assistant, make a horizontal incision over the tumor, from the angle to the symphysis, along the base of the inferior maxilla. A vertical cut over the symphysis from the lip to the end of the first incision will then free the flaps, which should be dissected back from the tumor, one being turned up on the cheek, and the other downwards and backwards. After sawing through the bone at the symphysis from without inward, shave off with a strong good scalpel all the soft parts on the inside, as far as the angle of the bone, then, drawing the bone outwards and forwards, use it as a lever (Plate XXV., Fig. 7); and, whilst its upper attachments are upon the stretch, insert behind the coronoid process, and just below the zygomatic arch, a bistoury, so as to detach the temporal muscle from its insertion. At the same time, whilst depressing the bone so as to dislocate the condyloid process, draw it forcibly forwards so as to remove it from the artery, and divide the capsular ligament and pterygoid muscles, which will generally free the jaw entirely, when the wound may be closed with a few stitches and adhesive plaster.

REMOVAL OF THE MIDDLE OF THE BONE.—The patient being arranged as before, seize one angle of the mouth with the left hand, while an assistant does the same with the other, and, whilst drawing the lip tense, divide it immediately in its middle by a single vertical incision. The two flaps being then shaved off from the bone to the desired extent, let them be held by the aids, whilst the teeth at the points of division are extracted, when the bone may be cut through, either by Hey's or the chain saw, the latter cutting from behind forwards, after being passed around the jaw by means

of a needle. If it is desirable to divide the bone from before backwards, a saw similar to that of Hey must be employed. (Plate XXV., Fig. 8.)

The point of the tongue being now held, either by a ligature introduced through it, or by means of a tenaculum, so as to prevent its being drawn back upon the pharynx, shave off the muscular attachments from the inside of the bone, and close the wound by sutures.

Should the portion of bone to be removed be the entire chin, it will perhaps be necessary to attach the tongue to the side of the cheek for a few days, by means of a suture, in order to prevent its retraction upon the glottis, lest this should induce suffocation.

BARTON'S OPERATION FOR REMOVAL OF HALF THE JAW, BY A LONGITUDINAL SECTION, without destroying the base of the bone, so as to preserve the line of the face.—The patient had a tumor (epulis), which had taken entire possession of the mouth, forcing the tongue into the pharynx, and stretching the jaws widely apart. It also rose up outside the superior maxillary bone (Plate XXV., Fig. 6), protruding the lips, cheek, and neck on the left side.

OPERATION.—An incision, which commenced over the left angle of the lower jaw, being carried on a line with the under edge of the base around to near the edge of the masseter on the opposite side, through the integuments and muscles of the cheek and lip, so as to open the cavity of the mouth, the under lip was cut through vertically towards the left commissure of the mouth, so as to meet the first incision at a right angle, when the tumor, being thus exposed, was found to be adherent to the anterior and posterior surfaces of the bone. These adhesions being detached from the anterior face of the bone as high up as it was sound (Plate XXV., Fig. 6), the bone was cut through longitudinally with a small narrow saw from without inwards, in a line parallel to the base of the jaw, and just below the maxillary canal, this section being extended as far back as the roots of the last molar tooth on the left, and the second molar on the right side. A vertical cut being then made through the alveoli between these teeth, so as to meet at a right angle the horizontal division of the bone (Plate XXV., Fig. 5), the portion thus insulated was found to contain the diseased mass, so that, after separating the attachments of the soft parts, the operator was enabled to take it away entire (Plate XXV., Fig. 6), leaving

the base of the bone in a healthy state, except at one point on the surface, which was readily taken off with the nippers. No blood-vessels required the ligature except the left facial and right coronary arteries. The flap being replaced, the vertical cut through the lip was closed by the harelip suture, and the remainder of the wound united by the interrupted suture and adhesive plaster. In a month, the patient was well; the contour of the face was preserved, and he was able to masticate his food with the three remaining molars and their antagonists of the upper jaw.¹

RESECTION OF A PORTION OF THE LOWER JAW, AND EXTIRPATION OF THE INFERIOR MAXILLARY NERVE, FOR THE CURE OF NEURALGIA.—OPERATION OF DR. J. M. WARREN, OF BOSTON.—An incision being made from the sigmoid cavity of the temporal bone down to the edge of the jaw, the parotid gland was raised and turned to the outside, when the lower portion of the masseter muscle was dissected up and a portion of the ramus removed by means of the trephine and chisel. The nerve being thus fully exposed, about half an inch of its main trunk was excised. The inferior maxillary artery was cut and tied, and there was also a slight discharge of saliva through the wound, from interference with the parotid.

II. RESECTION OF THE INFERIOR MAXILLA ENTIRE, OR NEARLY SO.

RESECTION OF THE INFERIOR MAXILLA, NEARLY ENTIRE.—OPERATION OF DR. GEO. MCCLELLAN, OF PHILADELPHIA.²—The entire substance of the lower jaw, in front of its angles, being affected with osteo-sarcoma, and the tumor having extended in all directions, and pushed the tongue back into the pharynx, so as to impede deglutition and respiration, Dr. McClellan operated as follows:—

OPERATION.—Making an incision through the integuments, from the left commissure of the lips obliquely downwards and backwards, he carried it over the anterior edge of the sterno-cleido-mastoid muscle, so as to command the internal carotid artery, if necessary. Having ascertained that the artery need not be touched, he next exposed the tumor by dissecting up the integuments, and, paying no attention to the small vessels, at once secured the facial artery, when the bleeding immediately ceased. After dissecting up the

¹ Am. Journ. of Med. Sciences, vol. vii. p. 331, 1831.

² Cooper's First Lines, edited by Sam. McClellan, p. 16, Phila. 1850.

insertions of the masseter a little way behind the tumor, he divided the bone on each side with a metacarpal saw, turned the tumor out of the mouth, and dissected from the under surface of the tongue such portions of the submaxillary glands as were sound, when the remainder, and especially a portion of the left submaxillary, were removed with the tumor. Only three small arterial twigs required a ligature, and the wound was closed by sutures and adhesive plaster, the large cavity under the tongue being filled with lint to support the skin. This patient recovered and lived some months subsequently, and the preparation is now the property of his son, Dr. J. H. B. McClellan, of Philadelphia, who has deposited it in the Museum of Pennsylvania College, Philadelphia.

REMARKS.—This operation was a very bold and successful one, but appears to have been generally overlooked by the profession, though its performance at so early a date should have given it a prominent position, especially as no surgeon had then attempted as extended a resection.

RESECTION OF THE INFERIOR MAXILLA ENTIRE.—OPERATION OF DR. J. M. CARNOCHAN, OF NEW YORK.—A patient in the Emigrants' Hospital having long suffered from a necrosis, which had loosened the teeth in the lower jaw, partially denuded the alveolar ridge, and caused great suffering and depression, it was decided to remove the inferior maxilla. The patient being seated, an incision was first made commencing opposite the left condyle; then passing downwards to the angle of the jaw, about two lines in front of the posterior border of the ramus, it was extended along the base of the jaw, and made to terminate by a slight curve on the mesial line, half an inch below the free margin of the lower lip. The flaps being dissected off, the bone was laid bare, and the tissues forming the floor of the mouth separated from their attachments, from the mesial line back as far as the angle of the jaw. The attachments of the buccinator being next divided, and the facial and sublingual arteries tied, the bone was found to be partially separated at the symphysis, and completely necrosed from this point to the inferior portions of the ramus, the latter being also diseased. A double ligature having now been passed through the anterior part of the tongue, and intrusted to an assistant in order to prevent its falling back upon the orifice of the larynx, the bone was broken at the symphysis and at the angle, and this portion readily removed; when, by pulling on the ramus, it was disarticulated and removed, after

being freed from the soft tissues by the use of the knife and blunt-pointed scissors, without any injury to the internal maxillary artery. The same incision and dissection being practised on the opposite side, the bone was disarticulated in a similar manner at this joint, also without injury to the bloodvessels, and the amount of blood lost was inconsiderable. Union of the wound occurred in forty-eight hours, and the patient afterwards recovered, articulation being sufficiently distinct to render words intelligible, whilst his food was broken up by the pressure of the tongue against the roof of the mouth.

REMARKS.—Although so important a portion of the general outline of the face and of the organs of mastication is necessarily removed in the resection of the lower jaw, the deformity which results from the operation is by no means such as might be anticipated. In the case of a gentleman, formerly an Interne of Lisfranc's at the hospital of La Pitié, and whom I saw in Paris in 1839, the deficiency was admirably concealed by his whiskers; and in the modification proposed by Dr. Barton, of Philadelphia, where a rim of the base of the jaw was left, it is very slight. In all cases, where the amount of the disorder will permit it, Dr. Barton's method of operating will be found to be the most advantageous; but it is essential to a successful result that as much as possible of the base of the bone below the orifice of the nutritious artery be preserved in order to obviate the risks of necrosis from the want of circulation.

In reviewing the various methods of operating, it is, therefore, apparent that, as the object of all is the same, the modifications will be chiefly such as are demanded by the peculiarities of the case. There are, however, certain general points connected with all of them, which it is desirable should be remembered in every similar operation, and which, as they have been sanctioned by the extended experience of Dr. Gross, I shall refer to by condensing the substance of another of his papers.¹ After referring to the dangers as well as inutility of previously ligating the carotid, in this resection, Dr. Gross gives the following general rules:—

1st. Always keep in close contact with the morbid structures, but not so close as to leave any portion of them behind; this saves hemorrhage.

¹ "On Excision of the Inferior Maxillary Bone, illustrated by five Cases:" *Western Journ. Med. and Surg.*, vol. x. 3d series, p. 277.

2d. Work with the handle of the knife as much as possible, instead of the edge and point, especially in detaching the soft parts from the bone, saving the periosteum, if possible.

3d. Make the external incisions so as to conceal the unsightly cicatrix, and without, if possible, removing any of the integument.

4th. If the disarticulation is very difficult, make a horizontal incision just below the zygomatic arch, avoiding the duct of Steno.

5th. In removing the jaw, saw the bone first anterior to the tumor, and thus obtain the benefit of the leverage, and facilitate the division of the soft parts.

6th. In liberating the coronoid or condyloid processes, which, from their being expanded and diseased, is often very difficult, use a knife which is slightly curved on the flat of the blade, three and a quarter inches long, three-eighths wide, and about one line and a half thick, the end of which terminates in a convex edge, bevelled off in front and behind, and set in a stout rough handle, four inches long. This instrument acts as a lever as well as a knife.

STATISTICS.—When we remember the character and extent of the parts involved in this operation, it must be admitted that the success attending resection of the lower jaw, and the relief afforded by it from a painful and loathsome complaint, is such as is highly creditable to the surgery of the nineteenth century.

Out of about one hundred and sixty cases collected from various sources by Velpeau, there have only been forty deaths, or one-fourth of the whole number operated on, a success which is very great when compared with the serious character of the operation.¹ By referring to the Bibliographical Index, p. 72, it will also be seen that the operation is one which has been frequently resorted to by American surgeons, the whole number of resections of this jaw there referred to, and doubtless reported as those of special interest, being forty-two. As many others have been performed within my knowledge, which have not been reported, the whole number of cases operated on, including those reported by Velpeau, now amounts to more than two hundred.

¹ Velpeau, Méd. Opératoire, vol. ii. p. 620.

SECTION III,

OPERATIONS ON THE PALATE.

The occurrence of a fissure, either in the hard or soft palate, or in both, is most frequently the result of a congenital defect, and often coexistent with a similar fissure in the alveolar processes of the upper jaw as well as in the lip, as was mentioned when treating of the operation for harelip. In consequence of the effect of this fissure upon the tone of the voice, as well as upon the enunciation of words, it becomes desirable to attempt its closure by uniting the two halves, or by performing a plastic operation at as early a period as will be permitted by the patient, or rather so soon as the individual is willing and able to assist the operator in the efforts required for its execution. If the case is seen during infancy, the cure of the harelip will often diminish the size of the fissure in the palate, or materially aid the subsequent operation; but if both harelip and fissure of the palate are present in an adult, the operation must first be performed upon the lip, and then, if necessary, repeated upon the palate, the operation of staphyloraphy or union of the fissure of the palate being very much the same in principle as well as means of treatment with that resorted to for the relief of harelip.

§ 1.—STAPHYLOGRAPHY.

The operation of refreshing the edges of a fissure in the palate and then uniting them by a suture, was suggested by a French dentist, Le Monier, in 1764, and termed Staphyloraphy (σταφυλή, the palate, and ραφή, suture). After being for a time forgotten, it was revived by Græfe, of Berlin, in 1817, but methodized and first published with the rules for its performance by Roux, of Paris, about 1819. In 1820, a nearly similar operation was invented and executed by Dr. John C. Warren, of Boston, he being at the time ignorant of the views or operations of the other surgeons. In many respects, the steps proposed by Drs. Warren and Roux corresponded, though the means suggested by Dr. Warren were the simplest. The operation of the latter being, however, generally

PLATE XXVI.

A VIEW OF THE INSTRUMENTS EMPLOYED IN OPERATIONS UPON THE THROAT, AND ESPECIALLY IN STAPHYLOGRAPHY.

Fig. 1. Scissors for Excising the Uvula.

Schiveley's pattern. Drawn from the Instrument.

Fig. 2. Gibson's Glosso-catochus, or Spatula, to depress the Tongue.

Schiveley's pattern. Drawn from the Instrument.

Fig. 3. Schiveley's modification of Physick's Tonsilitome for excising the Tonsil Gland. The ring surrounds the tonsil, the needle transfixes it, and the angular knife shaves it off. Schiveley's pattern. Drawn from the Instrument.

Fig. 4. A long-handled double-edged Scalpel, for freshening the edges of the fissure in the operation of Staphyloraphy.

Schiveley's pattern. Drawn from the Instrument.

Fig. 5. Curved Scissors, with long handles for the same purpose.

Schiveley's pattern. Drawn from the Instrument.

Fig. 6. Physick's Forceps, with long handles, and holding a small needle of the proper curve, to facilitate its passage through the side of the Uvula. This curve may be readily given to the ordinary curved needle, simply by pressure and gentle heat. The catch on the handle of the forceps enables the operator to free the needle in a moment, after transfixing the part, and again to seize its point with the same instrument, so as to draw it through the opposite side of the fissure.

Schiveley's pattern.

Fig. 7. Gibson's Forceps for inserting the ligatures in Staphyloraphy, at the moment when the needle is passed through the palate.

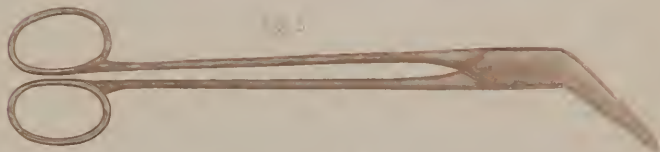
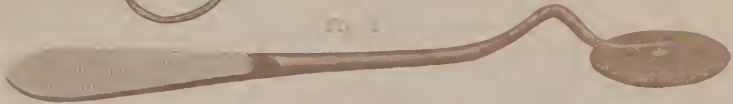
Schiveley's pattern.

Fig. 8. The same instrument drawing the ligature into its position.

Schiveley's pattern.

Figs. 9, 10. Needles of different sizes, as adapted to Gibson's Forceps. The shoulder near the spear point facilitates the grasp of the forceps, which close around it in consequence of a little split in the top of the first upright portion.

Schiveley's pattern.



regarded as the basis of the various modifications that have since perfected the proceeding, his plan may be first referred to.

OPERATION OF M. ROUX, OF PARIS.—Four different objects, which are to be attained in four different stages of the operation, have been laid down by M. Roux as likely to facilitate the surgeon's manipulation, and the success of the means employed.

1st. The paring off the edges of the fissure.

2d. The introduction of the ligatures at equal distances through its margins.

3d. The knotting of the ligatures and the approximation of the freshened sides of the fissure.

4th. The relief of any tension in the parts consequent on the suture.

INSTRUMENTS.—The instruments proposed by M. Roux for accomplishing these objects are sufficiently complicated, consisting of three silk ligatures, made of two or three strands, and waxed; of six small-curved but flat needles, each end of the three ligatures receiving one needle; of a *porte-aiguille* or needle-holder; of dressing forceps; and of a probe-pointed bistoury, and curved scissors.

OPERATION.—The patient being seated before a strong light, with the head thrown back and supported against the chest of an assistant, the mouth is to be kept widely opened by means of a cork placed between the molar teeth. The surgeon, being placed in front, then seizes, with the forceps held in his left hand, the right lip of the fissure; and, with his right hand armed with the needle-holder, introduces the point of the needle from before backwards behind the uvula, in order to traverse the flap from behind forwards (Plate XXVII., Fig. 1) at three or four lines from the free edge of the fissure. The needle, being now thrust in as far as its head, is then to be freed from the needle-holder, and seized at its point by forceps, which draw it and the ligature through into the mouth. After resting a few seconds, the same manœuvre is practised on the left half of the fissure with the other needle of the same ligature, the two ends of which are thus brought out into the mouth. In passing three ligatures, the operator should commence by the lowest, then pass the highest, and, lastly, apply the third in the middle of the fissure. Plate XXVII., Fig. 1, shows the ligatures as the last is being passed through the right side of the fissure.

The extremities of the ligatures, 3, 3, 4, 4, 5, 5, being brought

outside the mouth, and their loop or central portion depressed towards the pharynx, the surgeon proceeds to

FRESHEN THE EDGES OF THE FISSURE.—To accomplish this (Plate XXVII., Fig. 2), he should seize the lower end of the left margin with the forceps, 1, held in the left hand, and cut off the edge from behind forwards with the probe-pointed bistoury, 2, or curved scissors (Plate XXVI., Fig. 5), held in the right hand, cutting from below upwards, and prolonging the incision a little beyond the centre or angle of union of the two sides of the fissure. The other margin is then to be incised in the same manner by cutting a little beyond the angle of union, in order to free the flap.

In order to tie the ligatures, M. Roux commences by knotting the middle ligature (Plate XXVII., Fig. 1) with the fingers, and, after making a simple knot, confides it to an assistant, who holds with a *serre-nœud* (knot-tier), whilst he ties the second and then the first ligature, drawing them tighter than is necessary to approach the edges of the wound, in order to prevent any separation. This being completed, the ends of the ligatures are then cut close to the knots, and the patient kept from eating, drinking, or speaking during two or three days; the ligatures being removed on the third or fourth day, and the lowest ligature being left twenty-four hours longer than the others.

It is essential that the ligatures be placed at equal distances; that the points of each one be on the same level, and that they be at a proper and equal distance from the free edge of the fissure.¹ If, on knotting the ligatures, the strain upon the parts seemed to be too great, or such as might excite an apprehension of their tearing out, Roux made an incision in the sides of the soft palate (Plate XXVII., Fig. 5), and allowed these wounds to heal by granulations.

OPERATION OF DR. JNO. C. WARREN.—In the case of a young girl, aged seventeen years, who from birth had suffered from a cleft on the left side of the uvula, extending as far as the *ossa palati*, where the fleshy membrane was so thin as to be transparent, the operation of staphyloraphy was performed by Dr. Jno. C. Warren, of Boston, as follows:—

“The patient being well supported and secured, a piece of wood an inch wide, a little curved at the end, and with a handle to be held by an assistant, was placed between the molar teeth on one side, to

¹ Bernard and Huette, p. 207. Paris, 1850.

keep the mouth open. A sharp-pointed curved bistoury was then thrust through the top of the palate, above the angle of the fissure, and carried down on one edge of the cleft to its extremity (Plate XXVII, Fig. 3); and the same was done on the opposite side, so as to cut out a piece in the form of a letter V, including about a line from each edge. Next, a hook, or curved needle, fastened in a handle, with an eye on its extremity, and a movable point armed with a triple thread of strong silk, was passed doubled into the mouth through the fissure and behind the palate, and the latter pierced by it at one-third the length of the fissure from the upper angle of the wound, so as to include about three lines of the edge of the soft palate. The eye with the ligature, being seen, was seized by a common hook and drawn out. The eyed hook was then drawn back, turned behind the palate, and the other edge transfixed in a similar manner. A second and a third stitch were now passed in the same way, the third being as near as possible to the lower end of the fissure. Then, seizing the upper ligature with the fingers, the knot was tied without using a *serre-nœud*, and placed on one side of the wound in order to prevent its pressing on the fissure; the others being tied in a like manner, and the fissure closed. The patient was exhausted by the operation, but soon revived; remained twenty-four hours without speaking or taking a drop of liquid into her mouth, then used a little water. In seven days, the stitches were removed, and she left the hospital a day or two after. Two years subsequently she swallowed perfectly and spoke well.¹

In 1826, a similar operation was successfully performed on a boy *æt.* eleven. The cure was perfect.²

REMARKS ON THE AMERICAN OPERATIONS.—The first of these operations is stated by Dr. Warren to have been original with himself, as he was not at that time acquainted with the operations performed in Europe. From the simplicity of the instruments employed, and the freshening of the edges from above downwards, his method has advantages over that of M. Roux, from the fact that the incision of the soft tissues is facilitated by the traction, whilst the flap, being left adherent above until the completion of the opposite edge, is less likely to cause irritation about the fauces. That

¹ Amer. Journ. of Med. Sciences, vol. iii. p. 1, 1821; and MS. Records of Mass. Hospital.

² Amer. Journ. of Med. Sciences, vol. iii. p. 1, 1828.

PLATE XXVII.

A FRONT VIEW OF THE OPERATION OF STAPHYLOGRAPHY.

Fig. 1. The operation as practised by Roux. 1. The needle-holder (*porte-aiguille*), in the act of carrying the last ligature through the right side of the fissure. 2. Dressing forceps holding this margin. 3. The first ligature as placed, the ends being brought out the angles of the mouth, and the loop being loose behind the palate. 4. The second ligature as introduced. 5. The third ligature. After Bernard and Huette.

Fig. 2. The three Ligatures, 3, 4, 5, as before shown, being accurately placed, the surgeon proceeds to freshen the edges of the fissure with a probe-pointed bistoury, taking care not to cut the loops of the ligatures. 1. Forceps holding the free end of the palate. 2. The bistoury paring off a strip.

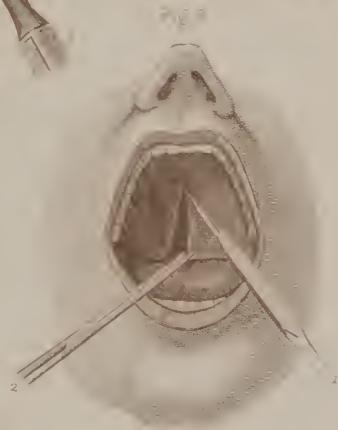
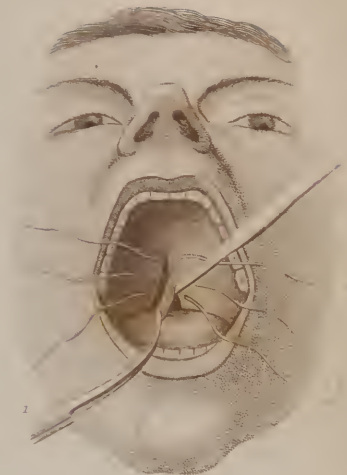
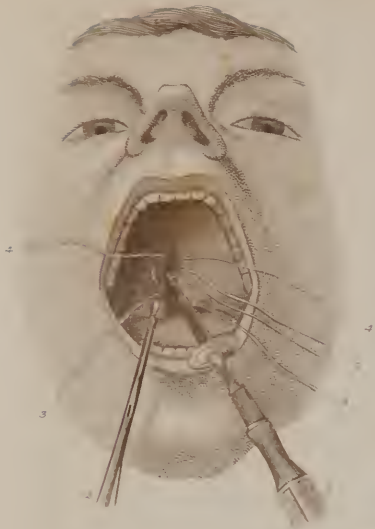
Fig. 3. Operation of Warren. 1. The knife freshening the edge of the fissure from above downwards. 2. The forceps steadying the margin so as to favor its regular incision. Modified from Pancoast.

Fig. 4. The introduction of the Sutures by means of Physick's Forceps and a curved needle. 1. Physick's forceps introducing the needle. 2. Dressing forceps seizing its point at the moment when it is liberated from the instrument of Physick. 3, 4, 5. Position of the sutures. They should all be introduced at equal distances and as nearly parallel as possible. After Pancoast.

Fig. 5. The operation of Staphyloplasty, as practised by Dieffenbach. 1, 2, 3. The sutures as tied, and closing the fissure. 4, 5. The two longitudinal incisions made on each side of the soft palate, so as to remove the strain from the line of union. After Bernard and Huette.

Fig. 1

Fig. 2



these two surgeons should devise similar expedients at the same time, and yet each be ignorant of the proceeding of the other, only shows the uniform tendency of different minds when devoted to the same object.

After the operation of Dr. Warren, Dr. A. H. Stevens, of New York, Sept. 1826,¹ also operated successfully by first inserting the ligatures, and then paring the edges.²

Dr. Mettauer, of Virginia, in 1827, operated for staphyloraphy, and in 1837 published an excellent essay,³ from which the reader may gain much that is of practical value. Dr. M. employed the leaden ligatures recommended by Dieffenbach.

Dr. Wells, of Columbia, South Carolina (1832), in a case of recent wound, was enabled to apply the sutures by heating a common (surgeon's) needle in a lamp, bending it to a proper curve, and passing it through the fissure by the aid of Physick's needle.⁴ This simple contrivance seems to have answered perfectly, and is certainly capable of supplanting all the more complicated instruments, and has been successfully used by Drs. Mütter and Pancoast, of Philadelphia,⁵ in staphyloraphy.

Dr. Gibson,⁶ of Philadelphia, operated with instruments of a useful kind, some of which have been transferred to these pages.

Dr. Alexander Hosack, of New York, also published, in 1833, a memoir upon this subject, with illustrations of his own instruments; and Dr. N. R. Smith, of Baltimore, employs a peculiar hook or needle for the suture.

In fact, there are few operations in which surgeons seemed to have felt the necessity of more perfect instruments than in that of staphyloraphy. Each one has, therefore, endeavored to improve on those of his predecessor, and especially in reference to the introduction of the needles, thus showing that placing the ligatures is the most difficult step in the operation. The simplicity and efficiency of Dr. Physick's forceps, as employed by Dr. Wells, of South Carolina, and subsequently by Drs. Mütter and Pancoast,⁷ removes,

¹ North American Medical Journal, vol. iii. p. 233.

² North American Medical and Surgical Journal, vol. iii. p. 233, 1827.

³ Amer. Journ. of Med. Sciences, vol. xxi. p. 309, 1837.

⁴ *Ibid.*, vol. x. p. 32, 1832.

⁵ See Bibliography.

⁶ Instit. and Pract. of Surg., vol. ii. p. 40.

⁷ See Operative Surgery, by Jos. Pancoast, M. D., Philad., and the papers referred to in the Bibliography.

however, this great obstacle to the rapid performance of the operation.

The advantages resulting from the transverse incisions suggested by Roux, or the lateral sections practised by Dieffenbach, have recently been more systematically presented and specially urged on account of their anatomical relations, by Mr. Ferguson, of London, in the *Transactions of the Royal Medical and Surgical Society* for 1845.¹ By many, the views of Mr. Ferguson are regarded as original; but the following facts show that he had been anticipated.

In connection with the history of an operation for fissure of the palate, Dr. J. Mason Warren published, in the *New England Quarterly Journal of Medicine and Surgery*, No. IV., p. 544, April, 1843, an account of the division of both the pillars of the palate, and of its happy influence upon the union of the freshened edges of the fissure. Mr. Ferguson's paper did not appear until December 21, 1844, when, in the *Medical Times*, he published an account of the dissection, from which he was led to suggest the special division of the levator palati and palato-pharyngeus muscles. As Mr. F. entered minutely into the anatomy of the structure concerned, and also demonstrated the importance of dividing these muscles, he has doubtless aided the progress of the operation; but it is apparent from the references just made, that the idea was not a novel one, having been put in execution nearly two years previously by Dr. Warren. Froriep also appears to have been fully aware of the value of this muscular division, having described and figured the part in his *Nottizen*, early in 1823.²

Dr. Mettauer, of Virginia, in 1837, also recommended the section of the muscles by repeated lateral incisions, as a preparatory step to the operation in cases of great loss of substance, allowing the parts to heal by granulations, &c., as suggested by Velpeau in *staphyloplasty*.³

To Mr. Ferguson, however, is certainly due the credit of demonstrating in a scientific manner the special effects upon the fissure, of each of these muscles, though they had been previously divided without any reference to the anatomical details of the region.

¹ Ferguson, *Practical Surgery*, p. 506, Philadelphia edition, 1848.

² *Chirurgische Kupfertafeln*. Weimar, 1823.

³ *Am. Journ. Med. Sciences*, vol. xxii. p. 309, 1838.

§ 2. STAPHYLOPLASTY.

In the operation of staphyloraphy, as just detailed, the attempts of surgeons have generally been limited to cases in which the fissure was only in the soft palate, the opening in the bony structure being left untouched or covered up by a metallic plate. The following ingenious operation, by Dr. J. Mason Warren, of Boston, presents a means of remedying the opening in the bones, as well as that in the soft tissues, by means of a portion of the neighboring structure. As the opening is thus closed by a flap taken from the adjoining soft parts, being made to slide over the fissure, as in plastic operations elsewhere, the operation has been termed Palatoplasty, Staphyloplasty, or Uranoplasty, according to the position of the opening, either of which names is sufficiently applicable to the operations on any part of this structure.

OPERATION OF DR. J. MASON WARREN, OF BOSTON.—The patient being placed on a low seat, in a strong light, has his head firmly supported against the breast of an assistant, who raises or depresses it, as circumstances may require. The patient is then directed to keep the jaws widely separated, to retain any blood which may collect, as long as possible, so as not to embarrass the operator and restrain all efforts at coughing, in all which he should be encouraged by the surgeon. The use of a speculum is deemed by Dr. Warren altogether inadmissible, as it obscures the light and prevents the proper manipulation of the instruments. The mucous membrane of the hard palate being now carefully separated from the bones with a long double-edged bistoury, curved on the flat, should be rather peeled than dissected off, in consequence of the difficulty of making any sawing motion with the knife in this confined position, the obstacles being always greater in proportion to the obliquity of the palatine vault. As the dissection approaches the connection of the soft parts with the edges of the palate bones, where the muscles are attached and the union most intimate, great care must be taken lest the mucous membrane be perforated; and as soon as this dissection is terminated, it will generally be found that, by seizing the soft palate with the forceps, it can be brought into the median line. If the fissure is wide, and this cannot be effected, then the soft parts being forcibly stretched, a pair of long powerful French scissors, curved on the flat, should be carried behind the anterior pillars

of the palate, and its attachments to the tonsil and to the posterior pillar carefully cut away, when the anterior soft parts will at once be found to expand and an ample flap be provided.

The edges of the palate may now be freshened by seizing them on either side with hooked forceps, and removing a slip with the scissors or sharp-pointed bistoury. A small curved needle, armed with a strong silk thread, confined in forceps with a movable slide (Physiek's), should then be introduced at the upper edge of the fissure, and carried from before backwards on the left side, and from behind forwards on the right, or *vice versâ*. Three or four ligatures being thus introduced, the patient should clear his throat of mucus and blood, the ligatures be wiped dry, and tied with deliberation, beginning at the upper and proceeding gradually downwards, waiting a little between each ligature in order to allow the throat to accommodate itself to this sudden and almost imperceptible tension of the soft parts. No forceps are required for holding the first knot while the second is tied, the object being better effected by making two turns of the thread instead of one, and by enjoining perfect quiet on the patient until the second knot is tied.

Dr. Warren has always arrested the hemorrhage consequent on the incisions by iced water and the finger, and does not wait before introducing the ligatures. The ligatures also were generally removed in forty-eight hours, or on the third day; drinks were employed with caution from an early period, and the patient was nourished by oatmeal gruel in injections.¹

VELPEAU operated successfully, and closed an opening in the hard palate three-quarters of an inch long and half an inch broad, by the following means:—

OPERATION.—Having noticed that the fibro-mucous membrane of the palate, in consequence of its firmness and slight vascularity, was very apt to mortify and slough, either in whole or part, the operation was performed as follows: Two flaps, six to ten lines long, of a triangular shape, were cut, one from in front, the other from behind the opening and dissected off, and brought down towards each other. Then, being united by means of a suture at their apices, a wound was left, which gradually closed up the fistula in every direction by the approximation and cicatrization of its

¹ Operations for Fissures of the Soft and Hard Palate (Palatoplasty), by J. Mason Warren, M. D. New England Quarterly Journal of Medicine and Surgery, No. IV. p. 358. Boston, 1843.

borders, the cure being aided by a longitudinal incision, made from time to time upon the two sides of the opening, as well as by occasional transverse ones upon the root of each flap.¹

Dr. Pancoast, of Philadelphia, has repeated this operation, with some modifications, and obtained partial success.²

STATISTICS.—The results of this operation are shown by the following cases: Of twenty-four cases operated on by Dr. Warren,³ it appears that he has succeeded in twenty-three of them; and Roux, in 1842,⁴ obtained a success of two out of three in simple fissure, but of only one out of three when it was complicated with a fissure in the hard palate.

From a recent statement⁵ by Dr. J. Mason Warren to the Boston Medical Society, it appears that this surgeon "has latterly performed five operations, in two of which the hard palate was badly fissured, and that all had proved successful. In one of these, where the fissure extended through the hard palate and alveolus, the soft palate and a portion of the mucous membrane, which was peeled off the palatine arch, united. In regard to the result of these operations, Dr. Warren also states that he has recently seen a young lady on whom he had operated some years since, and that the power of speech was quite restored, so that she enunciated with great distinctness. In almost every case the speech improved, the deglutition was easier, and the fauces were relieved from the dryness and inflammatory attacks to which they were formerly liable."

CHAPTER XIII.

OPERATIONS PRACTISED UPON THE EAR.

THE operations resorted to for the relief of disorders of the Ear consist in those required for the external and those demanded by the internal portions of this organ.

As the details of this department of surgery are sufficiently extended to have engaged the entire attention of a special class of

¹ Velpeau, *Med. Operat.*, tome i. p. 681.

² *Operative Surgery*, p. 357.

³ See Bibliography, p. 80.

⁴ *Gazette Médicale*.

⁵ *Am. Journ. Med. Sciences*, vol. xxv. N. S. p. 95, 1853.

PLATE XXVIII.

OPERATIONS UPON THE EAR.

Fig. 1. A Vertical Section of the Head, in order to show the angular course of the Eustachian Tube and of the External Auditory Canal. 1. The inferior turbinated bone. 2. The middle turbinated bone. 3. The pharyngeal orifice of the Eustachian tube, directly behind the posterior extremity of the inferior turbinated bone. 4. The angular direction of this tube. 5. The membrana tympani. 6. The external auditory canal; its direction completes the arch formed by the Eustachian tube. 7. The carotid artery.

After Bernard and Huette.

Fig. 2. A coil of silver wire forming a Spring for the retention of a Catheter in the Eustachian Tube, and attached to the nostril.

After Bourguery and Jacob.

Fig. 3. Itard's Frontlet for the same purpose.

After Itard.

Fig. 4. A view of the Frontlet as applied.

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Fig. 5. Perforation of the Tympanum by Delean's Instrument. 1, 2. The instrument. 3. The membrana tympani at the point of perforation, so as to avoid the handle of the malleus.

After Bernard and Huette.

Fig. 6. Removal of a Polypus, by the Forceps, from the External Auditory Canal.

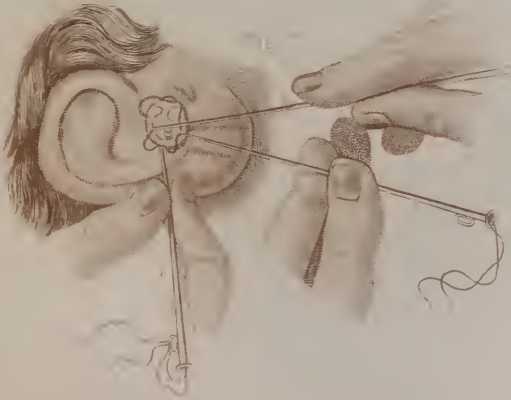
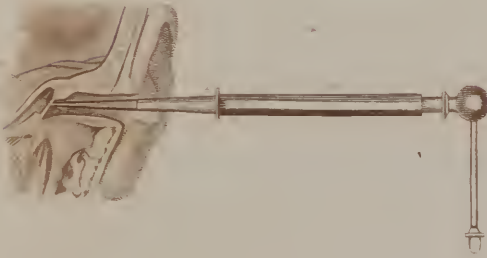
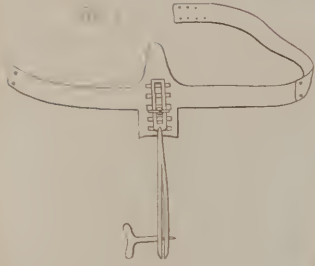
After Bernard and Huette.

Fig. 7. Fabriji's mode of strangulating Aural Polypi by the repeated application of the ligature with its canula. 1. The hand of an assistant holding the canula. 2. The second canula and ligature about to be applied below the first. 3. The fingers of the surgeon passing its loop over the first canula by means of a probe.

After Bourguery and Jacob.

Fig. 8. A vertical section of the ear, showing the subsequent constriction of the base of the tumor.

After Bourguery and Jacob.



those who desire to be able to treat its various complaints, the present account must be limited merely to the general anatomical and operative details.

SECTION I.

ANATOMY OF THE EAR.

Of the two portions of the ear, one is external, being the ear of common language, whilst the other is designated as the internal ear, being the structure mainly concerned in the sense of hearing.

The External Ear consists of a fibro-cartilaginous and fleshy substance, which is covered by the skin and attached to the side of the head by ligaments and muscles, and of a cartilaginous tube which leads from the external meatus to the internal ear. The Lobus, or soft and fleshy portion of the ear, is at the inferior extremity of the organ. When lost, it may be, in a measure replaced by a plastic operation (technically known as otoplasty), in which a flap is taken from the adjacent integuments and attached to the cartilaginous portion, as will be detailed hereafter.

The Meatus Auditorius Externus, or orifice of the cartilaginous tube, is at the bottom of the concha or fossa, found in the external ear. Its orifice is about three lines in diameter. The canal itself in the adult is an inch long from its orifice to the membrana tympani, or septum which closes it inwardly, and it is narrower in the middle than at either of its extremities.

This tube is also more expanded downwards than it is transversely; consequently, foreign bodies lodged in it may be most readily seized by forceps passed beneath and above the object. The speculum should also be opened in the vertical line instead of transversely.

As the cartilaginous tube runs inwards with a slight inclination forwards, and with a convexity upwards in its curvature, it is requisite to pull the external ear *upwards and backwards* when it is wished to look to the bottom of the canal.

The Membrana Tympani (Plate XXVIII., Fig. 1) is a complete membranous septum interposed between the meatus externus and the tympanum at the bottom of the canal just spoken of. It is placed very obliquely across the meatus, so that its upper edge

inclines outwards, and its lower edge inwards, the latter forming a very acute entering angle with the floor of the meatus or the cartilaginous canal (Plate XXVIII., Fig. 1), which gives it an additional length, and renders it difficult to see to its bottom. An examination of the part, therefore, requires a strong light.

The membrane of the tympanum is slightly tense, and has its middle drawn inwards in consequence of its being attached to the handle of the malleus.

IN THE INTERNAL EAR, the tympanum is the portion which is interposed between the meatus auditorius and the labyrinth.

At the fore part of the tympanum is the Eustachian tube, which runs for six or eight lines in the petrous portion of the temporal bone, and terminates in a cartilaginous and membranous portion, which communicates with the pharynx at the posterior nares (Plate XXVIII., Fig. 1).

The orifice of the Eustachian tube is found in the upper part of the throat, on a line with the posterior end of the inferior turbinated bone. It is rounded, oval, or trumpet-shaped, and large enough to admit the tip of the little finger (Plate XXVIII., Fig. 1). The canal in its whole length measures nearly two inches, and its course is nearly horizontal, backwards and outwards towards the membrana tympani, diminishing as it goes backwards, so as to receive with difficulty a small probe. It is lined in its whole extent by a fine and extremely delicate mucous membrane, which is continuous with that in the throat.¹ In catarrhal affections, its mucous secretions sometimes fill the whole cavity of the tympanum; and it is also liable to adhesions of its side, as well as to stricture.

SECTION II.

OPERATIONS ON THE EAR.

§ 1.—OTOPLASTY.

The formation of a new lobe for the ear is a plastic operation, invented by the late M. Dieffenbach, of Berlin, in which a proper-shaped flap is taken from the side of the head, or rather from the lateral portion of the neck, and, being slid from its original position, is fastened by sutures upon the deficient part. After union has

¹ Horner's Special Anatomy, vol. ii., Philadelphia, 1851.

taken place, the flap is cut free at its base, as in the operations of Rhinoplasty.

Another mode of operating will be found in the following method of Dr. Pancoast, of Philadelphia:¹—

OPERATION.—A piece of integument, rather larger than the natural size of the lobe, was marked out by an incision in front of the ear, and a semicircular portion of larger size, but narrowed where it touched the cicatrix, dissected up from behind the ear or over the insertion of the sterno-cleido mastoid muscle. A sharp-pointed bistoury being then passed under the front portion of the ear, it was freed from its attachments by a single sweep of the instrument, and the everted edge of the tragus loosened with the knife, leaving a raw surface, which was of considerable size, and bled freely, but without requiring ligatures. The margins of the wound in front being closed with the harelip suture and adhesive plaster, the posterior flap was brought round over the lobe to the anterior portion of the ear, where it was fastened with two stitches of the interrupted suture; the parts presenting a good appearance, though the lobe was purposely made larger than natural, in order to admit of the shrinking which always ensues upon operations of the plastic class. The lower point of the ear, which had been strained downwards by the cicatrix, retracted when loosened during the operation to nearly the natural length, and the success was perfect.

REMARKS.—This operation of Dr. Pancoast is a slight modification of that of Dieffenbach, and was performed to relieve the cicatrix from a burn, the pinna being drawn close to the head, and the lobe lost in the common covering of the face and neck.

Any operation for the restoration of the lobe is, however, one of doubtful utility. At best, the restored portion cannot aid or affect the hearing, and will not resemble the lobe, whilst the removal of the flap produces cicatrices upon the neck, which are apt to cause a greater deformity than that arising from the original defect.

The removal of tumors from the lobe requires the same steps as those demanded by tumors elsewhere. In several cases reported by Dr. Geo. W. Norris, of Philadelphia,² they resembled keloides; and, as it appears from Dr. Norris's statement, are most common in the negro race, being the result of perforation of the lobe for the use of ear-rings.

¹ Am. Journ. of Med. Sciences, vol. v. N. S. p. 100, 1843.

² Am. Journ. Med. Sciences, vol. xx. N. S. p. 557.

§ 2.—FOREIGN BODIES IN THE MEATUS AUDITORIUS EXTERNUS.

Foreign bodies, as found in the external meatus of the ear, are very varied, and may consist of insects, beads, coffee-grains, or similar articles, accidentally introduced into the meatus, or of collections of hardened wax, combined with epithelial scales, wool, hair, or other substances, either naturally or accidentally collected in the tube itself.

I. EXTRACTION OF FOREIGN BODIES.

OPERATION.—Whenever it is desired to remove an insect from the ear, the head of the patient should be inclined to one side, and the meatus filled with any mild oil, which is to be retained in the ear a few minutes, by keeping the patient's head in an inclined position. The oil thus occupying the tube closes the respiratory pores of the creature, and soon either kills it or causes it to seek the orifice, to obtain air or to escape, when it may be seized, or subsequently washed out with a syringe and tepid water, especially if inflammation exists, as this increases the sensibility of the part.

If the foreign body should be a hard substance, and one not capable of absorbing water, then the best plan of removing it will be to wash it away by the force of a stream of water thrown in on one side of it, and made to fly outwards from the resistance created to its entrance by the surface of the membrane of the tympanum.

II. TO WASH OUT FOREIGN BODIES.

OPERATION OF DR. MARION SIMS, OF ALABAMA¹ (now of New York).—Introduce the point of a long, but large-nozzled syringe, as near as possible to one side of the foreign body, there being very few that will distend the meatus so completely as to prevent the passage of a stream of water on one side. Then drive in a full stream with all the force of the syringe, and the recurrent stream will generally bring the foreign substance to a point where it may be seized with the forceps or curette.

¹ See Bibliography, p. 80.

As the necessity of washing out the ear is often noticed in the treatment of otorrhœa, the removal of hardened wax, or for the examination of the membrana tympani, the following neat method of accomplishing it is given, as, though a simple operation, I have often seen patients soiled and annoyed by its imperfect performance:—

TO WASH OUT THE AUDITORY CANAL.—Direct the patient to hold a large teacup close under the lobe of the ear, and press it firmly against the mastoid cells. Then, whilst the ear is drawn upwards and backwards by the surgeon's left hand, let him hold the body of the syringe between his thumb and second finger, whilst his forefinger forces in the stream from the syringe by pressing on the piston. If the force of the stream is not too great, the water will all pass into and not over the cup, and the patient's neck and clothing will not be in the least soiled, or even dampened.

REMARKS.—In introducing any instrument into the ear of an adult, the peculiarity of the shape of the external canal should be recollected. The operator should, therefore, pass it either from above or below, so that it may correspond with the largest dimensions of the canal, the vertical diameter of the meatus being greatest in this direction; but in a child it should be directed either towards the front or back of the meatus, as the transverse measurement is here the greatest. Hardened wax may be softened by warm oil or water, and then either picked out with the scoop or washed out with the syringe, the ear being drawn upwards, outwards, and backwards, in order to facilitate its escape, by straightening the cartilaginous tube.

Should every other means fail, the surgeon may resort to the plan of Paulus Ægineta, and, perforating the cartilaginous tube from below, introduce a probe behind the foreign body, and thus push it outwards.

§ 3.—POLYPI IN THE MEATUS EXTERNUS.

Polypi in the ear, like polypi elsewhere, may be of different kinds, that is, either soft, mucous, fleshy, or carcinomatous. Generally, these tumors arise from the tympanum, or its membrane, and, distending the meatus, sometimes project externally (Plate XXVIII., Fig. 6). If of the soft kind, they may be removed by seizing them

with forceps, and rotating the latter until the polypus is twisted, when simple traction will suffice to remove it; or, if it is possible to pass a loop around the growth, its strangulation may be effected by a wire or silk ligature in a small double canula like that of Levret, as I have done in two cases successfully. If more firm, the polypus may require excision in pieces, the hemorrhage being readily arrested by compression in the meatus. In all cases, however, it is usually desirable to apply the nitrate of silver to the seat of the tumor after its removal; to keep the meatus clean, by repeated syringing, and to employ astringent washes, occasionally.

Where the polypus is very large, and fills up the meatus externus entirely, the repeated applications of the wire ligature will enable the surgeon to remove it entirely.

OPERATION OF FABRIZZI, OF MODENA.¹—The patient being so seated as to throw the light into the meatus, the surgeon should pass the loop of a wire ligature, contained in a double canula, around the polypus, passing it by means of a probe as far as possible into the auditory canal and towards the base of the tumor. Then after firmly constricting it with this loop, let him next pass the loop of a second ligature in its canula, over the first, drawing upon the latter so as to carry the second ligature as deeply as possible, and, constricting the tumor by this, remove the first ligature and canula. If the second thread does not cause the tumor to come away, carry a silk or buckskin ligature in a flexible canula below it, and twist it until the tumor is cut off. (Plate XXVIII., Figs. 7, 8.)

§ 4.—PERFORATION OF THE MEMBRANE OF THE TYMPANUM.

Perforation of the membrana tympani was suggested by Sir A. Cooper in 1800, in order to permit the entrance of air into the middle ear when the Eustachian tube was permanently closed, or when the membrane was too much thickened and changed to vibrate. Although a simple operation, it has not been much practised, owing, apparently, to a want of confidence in its utility, or of fear, lest injurious consequences should result. Such fears are, however, groundless; the puncture being readily made, not productive of great pain, and often healing with great facility.

¹ Bourguery, Méd. Opérat., tom. 7^{me}, p. 33.

OPERATION OF SIR ASTLEY COOPER.—After inclining the head, so that a strong light shall fall directly into the meatus, introduce a small trocar, or the instrument of Deleau (Plate XXIII., Fig. 19), or the knife of Horner (Plate XXIII., Fig. 17), at the anterior inferior side of the membrane, and transfix it so as to avoid the handle of the malleus.

REMARKS.—In cases where the Eustachian tube is closed by mucus, and the surgeon finds it difficult to clear or dilate it by catheterism through the nostril, or when he wishes to assure himself positively that this tube is patulous, perforation of the membrane of the tympanum will enable him to act upon the cavity of the tube very advantageously, and to test with great certainty the condition of the inner portion of the ear by forcing a current of air from a syringe through the meatus externus against the puncture in the membrana tympani. As the wound in the membrane will heal readily, the patient runs no risk of injury if the Eustachian tube prove to be totally impervious, whilst, if choked, it can be thoroughly cleansed by driving the mucus into the throat in the natural course of the tube. By thus demonstrating the pervious condition of the tube, the diagnosis of the character of the deafness will be much simplified.

OPERATION OF DR. WILLIAM E. HORNER, OF PHILADELPHIA.—A method, which the late Dr. Horner practised on many occasions, enabled him to pass a stream of water or air from the meatus externus into the throat, and thus clear the Eustachian tube more effectually than can possibly be done by means of a catheter passed into its orifice from the nose. It is accomplished as follows: Perforate the inferior half of the membrana tympani by a sabre-shaped knife, one line in breadth, the edge of which is on the convex margin (Plate XXIII., Fig. 17), by first plunging the cutting edge upwards, and then revolving it on its axis, so as to make the incision either angularly or of the shape of a V, as this will leave a flap easily moved. A small pipe, surrounded by a cork (Plate XXIII., Fig. 21), being then introduced tightly into the meatus externus, so as to plug it up, and a small syringe, holding an ounce and a half, being adapted to the pipe, the water may be forced through the hole pierced in the membrana tympani, as just directed, and thus pass into the internal ear and out of the pharyngeal orifice of the tube. The stream thus being thrown in, will now be found to wash out the tympanum and Eustachian tube, with great facility,

as may be readily ascertained by seeing the water escape from the throat or nose. The air douche may also be most perfectly accomplished in the same manner; in any other way it is very defective, and not to be relied on for what it professes to do, viz., to open the Eustachian tube, as a very little reflection will prove. For example, let the same cork be fitted into a vial, and then let the operator try to inject air from the syringe into the bottle, and he will have a representation of the real effect of the air douche by the catheter introduced into the Eustachian tube from the nostril, as usually practised.

REMARKS.—Though Dr. Horner often performed this operation, he never knew it to do harm, but has, on the contrary, known it to do good. The principal idea of the profession, at one time, in regard to the cause of deafness, was (as evolved by the assertions of leading aurists), the fact of there being an obstruction of the Eustachian tube. This Dr. Horner believed to be an error, the obstruction of this tube being, in his experience, very unusual as a simple form of disease, though large claims were made upon public credulity by those who boldly asserted its existence.

In the air douche, by the catheter passed into the Eustachian tube, as usually advised, the introduction of the air may be regulated by a column of water acting on a large reservoir of air, or by means of the cock in the canister (Plate XXIII., Fig. 23), or by simply resorting to the caoutchouc bottle (Plate XXIII., Fig. 22).

§ 5.—CATHETERISM OF THE EUSTACHIAN TUBE.

When the position of the orifice of the tube in the pharynx is recollected (Plate XXVIII., Fig. 1), it will be seen that the introduction of the ear catheter through the nostril and pharynx is also a simple operation, though the verbiage in which it has often been described tends to create a belief in its being difficult. Aurists have recommended various instruments for the performance of this operation, and the catheters most in repute are those figured in Plate XXIII., Figs. 12, 13.

ORDINARY OPERATION.—The patient being seated with the head slightly thrown backwards and firmly supported, take the catheter in the right hand, and, after oiling it, introduce it into the nostril on the side to be sounded. Then, keeping its point upon the floor

of the nostril, and its convexity upwards and inclined against the septum narium, slide it backwards until it reaches the soft palate, as may be readily told by the sense of touch transmitted along the instrument, or by the patient making a slight gulp or effort to swallow. At this moment, turn the point of the catheter upwards and outwards by rotating it a quarter of a circle, and then, by a slight movement forwards and backwards, slip it into the orifice of the tube, and it will pass with as much, if not more ease than a catheter can be made to enter the bladder. The proper position of the instrument may be at once known by its steadiness, as well as by the sensation of the patient.

When it is desired to inject air or liquids through the instrument, compress the nostrils and catheter in the fingers of one hand, and employ the syringe or gum elastic bottle with the other, or resort to a little wire spring (Plate XXVIII., Fig. 2), or to a frontlet (Plate XXVIII., Fig. 3).

The frontlet, forceps, air-drum, &c., will all be found essential to the operations of those who may wish to devote themselves especially to aural surgery; but, for the general operator, the instruments, figured in Plates XXIII. and XXVIII. will prove sufficient.

Cases of deafness have been occasionally met with in which the aurist has found it impossible to pass the catheter into the pharyngeal orifice of the ear, and the cause of the difficulty has been either unknown or undescribed, in consequence of the rarity of a *post-mortem* examination of this region.

The attention of the profession has, however, been lately called by Dr. Jno. Neill, of Philadelphia,¹ to the results of several *post-mortem* examinations, in which he has noticed a peculiar condition of this orifice of the Eustachian tube, it being overhung at its superior and posterior border by a thickening and hypertrophy of the mucous membrane with enlarged follicles, which is doubtless the occasional cause of deafness. Dr. Neill thinks it probable that the supposed enlargement of the tonsils which have so frequently been supposed to be the cause of deafness, may be readily owing to the condition which he has described.

REMARKS.—The almost universal necessity that exists in the United States for every surgeon to practise several distinct portions of his profession, as well as the absence of definite instruction

¹ Medical Examiner, vol. ix. p. 626, 1853.

in these complaints, usually noted in the ordinary courses of education in our medical schools, has, for many years, induced the majority of the profession to shun the treatment of aural complaints, and forced patients into the hands of empirics. All the operations upon the ear are, however, so easily practised, and the variety of the complaints requiring them so very limited, that this condition of things may be readily remedied by any surgeon.

In order to prove this, an effort has now been made to describe all the ordinary operations required for the relief of deafness, as fully as is necessary, and if the reader follows the foregoing descriptions, in connection with the plates, he will, it is hoped, find them full enough for all general points of practice connected with aural surgery. Washing out the external and internal auditory tubes, with perforation of the membrana tympani, or perhaps the mastoid cells, really constitutes the entire portion of aural operative surgery, and are operations which can be easily executed by any one who can lay claim to the qualifications of a surgeon. I think, therefore, that it is to be regretted that the difficulties of aural operations are so greatly overrated by physicians generally. The prognosis of the complaints requiring these operations is, it is true, often doubtful, or decidedly unfavorable, yet it should be remembered that, even when unable to cure, a practitioner may effect much good by assuring the patient of the impossibility of his being relieved, and every one should, therefore, gain such an amount of practical skill as will enable him to give an opinion. By washing out the meatus externus, and examining the condition of the membrane of the tympanum; by catheterizing the Eustachian tube, or by perforating the membrana tympani, and testing the permeability of the passage to the throat, as above described, much advantage will often be gained by the patient, whilst the profession will be able to rescue many persons from the hands of unprincipled men, who, in the majority of cases, only do them harm.

If the general practitioner would only give these cases the attention that they deserve, or place them in the hands of a judicious surgeon, he would do much to banish the wretched quackery in aural complaints now so often seen. Or if he would devote himself for a short period to the perusal of the excellent works of Mr. Wilde, or of Kramer, he could soon obtain abundant evidence that aural diseases are not as difficult to treat as he had at first, when inexperienced, been led to suppose. When deafness cannot be

cured by a scientific course of treatment, it becomes the duty of the practitioner to exert his influence in preventing the patient from wasting his time and money among charlatans and ignorant pretenders, whether pretending to cure by "Scarpa's acoustic oil," or by the magnetic, electropathic, or chronothermal plan of treatment. Having often been compelled to notice patients who, whilst incurably deaf, have yet received a tacit permission from medical men to try some of these pretenders, I wish to call the reader's attention especially to this point, and urge upon him the importance of thus attending to his patients' welfare, if only on the simple ground of "doing to others as he would they should do to him."

PART III.

OPERATIONS PRACTISED ON THE NECK AND TRUNK.

CHAPTER I.

SURGICAL ANATOMY OF THE NECK.

THE Neck is usually described by anatomists as that region of the body which is situated between the head and the trunk, being bounded above by the base of the jaw, mastoid portion of the temporal bone, and occipital part of the skull, and below by the clavicles, sternum, and scapulæ. In its general outline, this region is cylindrical or cylindroid, with the base upon the shoulders. On the front and sides it is decidedly convex, presenting certain well-marked prominences, which, by establishing fixed points of reference, are highly useful to the surgeon. On its posterior face it is flat and regular, presenting nothing deserving of especial notice.

The prominences and depressions seen on the front of a well-formed neck indicate the position of certain important organs which are often objects of solicitude to an operator. Thus, immediately above the sternum, in the median line of the neck, is a depression called the supra-sternal fossa, near or in which are usually found the roots of the large bloodvessels directly connected with the heart as well as several important nerves. Above this, in the median line, is the prominence caused by the larynx and trachea, and a little outwardly on each side of this line may be seen the elevation caused by the sterno-cleido-mastoid muscle. In front of this muscle, or between it and the trachea, is the carotid fossa or depression, where, from the superficial position of the vessel, its pulsations may be readily felt. At the base of the neck, near the clavicles and exterior to the sterno-cleido-mastoid muscle, is the supra-clavicular

depression or fossa, containing part of the subclavian artery and vein, together with some other vessels of importance; and at its upper portion, in the space adjoining the base of the jaw, are the parotid and supra-hyoid regions, which contain several important parts, as will be referred to more in detail hereafter.

The cylindrical shape of the neck, and the enlargement at its base, render the smooth application of a broad bandage around it nearly impossible, and it will hence be generally found necessary either to make all such pieces of dressing quite narrow, or to give them a curved shape on the lower edge like that seen in the stocks worn by men as an article of dress, in order to enable them to fit the clavicular portion of this region. A similar shape will also be requisite to adapt them to the upper and lateral parts of the neck, and especially to the outline of the chin and sides of the jaw.

Owing to the great importance of the various organs contained within the neck, and the necessity of an accurate knowledge of their relations to each other, it has been found advantageous to divide it into numerous sections or departments, either by imaginary lines, or by following the course of well-known muscles. Each of these sections demands special attention, the advantages of such a subdivision being found in the facility as well as accuracy with which the position of their contents may be recognized. Of the various regions thus created by anatomists, none seems to me to present points of greater practical utility than that employed by M. Blandin, in his *Anatomie Topographique*, and the following descriptions will, therefore, be based mainly on the accounts furnished by him. In mapping out the regions of the neck, M. Blandin has divided its anterior or Tracheal surface into those parts which are above and those below the os hyoides, and into such as are more or less closely connected with the course of the sterno-cleido-mastoid muscle. Of the portion above the os hyoides, he makes two regions, one the Supra-Hyoid or Hyo-glossal region, being the portion near the chin, and the other that about the parotid gland or the Parotid region. The parts below the os hyoides, on the front of the neck, he divides into the Laryngo-Tracheal and the Supra-Sternal regions, whilst those on the sides are designated as the Sterno-Mastoid, Carotid, and Supra-Clavicular regions. The boundaries of these regions being, however, a purely conventional one, we find that in mapping it out there is some difference in the descriptions of different writers.

By some of the English anatomists¹ the disposition has been shown to apportion the neck into regions of a more mathematical character than those adopted by Blandin. Thus, on the neck being extended, one-half of it is made to take the form of an elongated square, which square is divided by the course of the sterno-cleido-mastoid muscle into two triangles, one near the clavicle and the other near the jaw, in both of which are parts of vital importance. But though upon the subject, such a formation of regions may answer the descriptive purposes of the anatomist, it will not prove as useful to the surgeon as that adopted in the following pages, from the fact that any difference in the extension of the neck must cause the diagonal line to vary, and thus render the relations of the various parts incorrect, unless the utmost possible tension of the muscle is always obtained. As considerable experience has satisfied me of the practical utility of the system adopted by Blandin, it is recommended to the study of those who desire to obtain such a minute knowledge of this important section of the body as will fit them for the duties of the operator.

SECTION I.

THE SUPRA-HYOID OR GLOSSO-HYOID REGION OF THE NECK.

The Glosso-hyoid portion of the neck is bounded above by the inferior part of the tongue or base of the lower jaw; below, by the os hyoides, and laterally by a line drawn from the angle of the jaw to the extremity of the greater cornu of the hyoid bone, or by the expansion of that process of the fascia superficialis cervicis which is attached to the stylo-maxillary ligament and angle of the jaw. (Plate XXIX., Fig. 1.) The skin of this part presents nothing requiring special description. Its muscles consist of a portion of the platysma-myodes; of the anterior belly of the digastric, of the mylo-hyoid, genio-hyo-glossus, hyo-glossus, and a part of the stylo-glossus, all covered by a fibrinous expansion or fascia. This fascia being the second tegumentary covering of the neck, as of several other portions of the body, is attached in this region to the os hyoides and base of the jaw. It sends a triangular process over the muscles at this part, surrounds the submaxillary

¹ Surgical Anatomy, by Joseph Maclise, Philad. edit. 1851.

PLATE XXIX.

THE SURGICAL ANATOMY OF THE NECK.

Fig. 1. A view of the arrangement of the Fascia of the Neck. 1. Parotid gland. 2. Masseter muscle. 3. Submaxillary gland. 4. Os hyoides. 5. A portion of the fascia superficialis dissected from the side of the face, and held down to show its relations to the stylo-maxillary ligament and angle of the jaw, together with the septum which separates the parotid from the submaxillary gland. 6. Deep process of fascia superficialis which forms the septum just spoken of. 7. Internal jugular vein just beneath the angle of the jaw. 8. Deep cervical fascia. 9. Sternohyoid muscle partly displayed.

After Nature.

Fig. 2. A view of the Superficial Vessels of the Neck. 1. Inferior maxillary bone. 2. Lingual artery. 3. Os hyoides. 4. Superior thyroid artery. 5. Descending branch. 6. Position of carotid artery. 7. Sternal origin of sterno-cleido-mastoid. 8. Clavicle. 9. External jugular vein. 10. Its anterior branch. 11. Parotid gland and veins near angle of jaw.

After Bernard and Huette.

Fig. 3. A view of the deep-seated parts of the Neck. 1. The œsophagus. 2. Omo-hyoid muscle. 3. Par vagum nerve. 4. Internal jugular vein. 5. Carotid artery. 6. Digastric tendon. 7. Hypoglossal nerve. 8. Facial artery. 9. Facial vein. 10. Occipital and internal maxillary veins. 11. External carotid artery seen after removal of parotid gland. 12. Masseter muscle. 13. Pectoral muscle and clavicle. 14. Hook holding aside external jugular vein.

After Bernard and Huette.

Fig. 4. A front view of the veins of the Neck. 1, 1. Base of lower jaw. 2. Os hyoides. 3, 3. Internal jugular. 4. Omo-hyoid muscle. 5. Larynx. 6. Sterno-hyoid and thyroid muscles. 7, 8. Superficial veins. 9. External jugular. 10. Sterno-cleido muscle.

After Bernard and Huette.

Fig. 5. A side view of the Œsophagus and adjacent parts. 1. Facial artery and vein passing on to the face. 2. Lingual artery. 3. Os hyoides. 4. Superior thyroid artery. 5. Œsophagus. 6. Trachea. 7. Inferior thyroid artery. 8. Sterno-cleido-mastoid, cut across. 9. Primitive carotid. 10. Internal jugular. 11. Upper portion sterno-cleido-mastoid muscle.

After Bernard and Huette.

Fig 1

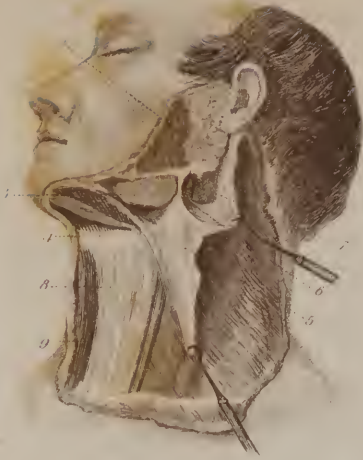


Fig 2



Fig 4

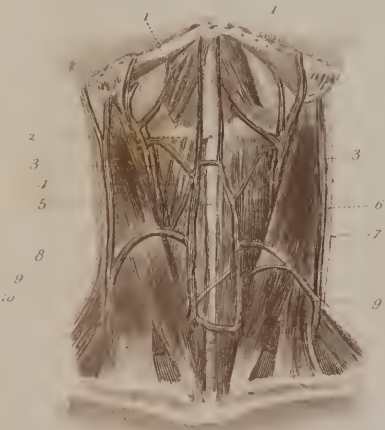
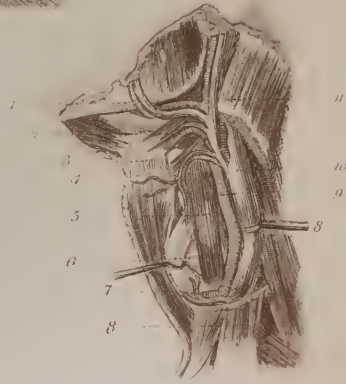


Fig 5



gland, and then, by attaching itself to the stylo-maxillary ligament and angle of the jaw, places the submaxillary gland in a kind of pouch, which separates it by a perfect septum from the anterior and inferior portion of the parotid. (Plate XXIX., Fig. 1.) This reflection of the fascia superficialis and its attachment to the stylo-maxillary ligament is a valuable point of reference in operating on this and the adjacent regions. It also exercises a material influence on the disorders of the part, by preventing suppurations in the neighborhood of the parotid or submaxillary glands from communicating or travelling either forward or backward; it has also considerable influence on the development of tumors and their subsequent shape and condition.

The principal Arteries found in this region are the facial, lingual, and sublingual. (Plate XXIX., Fig. 5.)

The Veins generally follow the course of the arteries, except the lingual vein, which, it should be remembered, is separated from its corresponding artery by the hyo-glossus muscle.

The Nerves are the hypo-glossal, lingual, glosso-pharyngeal, and their branches. (Plate XXIX., Fig. 3.)

SECTION II.

THE PAROTID REGION.

The Parotid region of the neck comprises its superior and lateral portions, and, though limited in extent, is of the highest importance to the surgeon. Bounded in front by the ramus of the inferior maxillary bone; behind, by the mastoid process of the temporal as well as by the meatus externus of the ear; above, by the zygomatic arch; below, by a horizontal line drawn a little below the level of the angle of the jaw; and within, or in its deeper points, by the styloid process of the temporal bone, as well as by the stylo-maxillary and stylo-hyoid ligaments; this region is closely circumscribed by dense tissues, and is generally accurately filled up by the parotid gland and its vessels. The muscles near the gland are the sternocleido-mastoid behind, to which, when enlarged, the posterior edge of the gland is often firmly attached; and the posterior belly of the digastric; the styloid muscles are within, or at the deepest side of the gland.

The Parotid Gland, in its normal condition, being seated between the angle of the jaw and the mastoid process of the temporal bone, is limited to these points; but, when diseased, will be found to encroach considerably upon the surrounding parts. Owing, however, to the expansion of the superficial fascia, and its attachment to the angle of the jaw, as before stated, the parotid is separated from the submaxillary gland, and cannot, therefore, extend itself to any great degree forwards. The styloid process and ligaments limiting its deeper progress, and the sterno-mastoid muscle resisting its posterior development, nothing is left it but to enlarge outwardly or towards the skin; and, as its progress in this direction is resisted by the portion of the fascia superficialis, which covers it and forms its capsule, the engorgement of this gland generally causes severe pain by pressing on the neighboring nerves. The dense character of the fascia, and its strong adhesions around the gland, have also an important influence upon the bloodvessels connected with it. In two cases which occurred under my observation, it led to the entire obliteration of the carotid artery, and in one to that of the internal jugular vein, as well as the artery. When enlarged by scirrhus or similar deposits, the shape of parotid tumors is always at first more or less flattened in consequence of this expansion of the fascia over the surface of the gland, though ultimately they may attain considerable size and a globular form. Having no proper capsule, in the normal condition, the parotid gland owes its shape, and the continuity of its structure, to cellular substance, the induration of which, as well as its adhesion to the fascia just alluded to, renders the extirpation of the gland much more easy when diseased than it is in the healthy condition.

The Arteries of the parotid region are numerous, and among the most important of those found in the neck. The External Carotid, entering at the inferior and internal portion of the gland, passes through its substance not far from its internal or deeper-seated surface, and extends between the ramus of the jaw and the ear to near the level of the neck of the jaw-bone, when it gives off the internal maxillary and the temporal arteries. The Internal Maxillary, winding around the neck of the bone between the pterygoid muscles, is hence difficult to ligate, and sometimes gives rise to considerable recurrent hemorrhage, even after the application of a ligature to the external carotid of the same side, as I have seen in three instances. The Veins follow pretty generally the course and distribution of the

arteries; but, owing to their direct connection with the internal jugular vein, caution is requisite in opening them, lest air be introduced into the latter vessel, whence it may readily pass to the heart and cause death.

The principal Nerve of this part is the portio-dura, which, emerging at the stylo-mastoid foramen, penetrates the substance of the gland from above downwards and forwards. Lymphatic Glands are also found in considerable numbers (Plate XXXIII., Fig. 1) around as well as beneath the structure of the parotid, and the disease of these glands has occasionally rendered the diagnosis of tumors in the parotid region difficult, and led to mistakes in respect to the structure involved in the complaint.

SECTION III.

THE LARYNGO-TRACHEAL AND SUPRA-STERNAL REGIONS.

The middle of the front of the neck, presenting points directly connected with the trachea and larynx, has been named the Tracheal region, and is formed by that portion which is bounded laterally by the anterior edges of the sterno-mastoid muscles. The part of this surface above the os hyoides has already been spoken of as the supra-hyoid region. The region immediately below it constitutes the Laryngo-Tracheal, the lower portion of which, or that nearest the sternum, has been called the Supra-Sternal region.

The Laryngo-Tracheal region presents several useful points of reference, which are apparent outside of the skin. Thus, in passing from the os hyoides to the sternum in the median line, there is the prominence of the hyoid bone, the thyro-hyoid depression or space between the os hyoides and the thyroid cartilage, and indicated chiefly by the notch in the top of the cartilage. Next may be felt or seen the crico-thyroid space; the prominence caused by the development of the thyroid gland; then the rounded surface of the trachea; and, lastly, the supra-sternal fossa or depression, the depth of which is generally increased when the patient expands the chest, as in taking a full inspiration. On the external or lateral portions of the region, near the anterior edge of the sterno-mastoid muscles, may be felt the pulsations of the primitive carotid arteries; and this, as before stated, has led some anatomists to designate this portion

of the neck as the Carotid region, instead of viewing it as merely the lateral boundary of the preceding part.

Examining the structures concerned in these portions of the neck, but little time need be given to the skin, which differs in nothing that is important from the same tissue elsewhere. Beneath it is seen the common Fascia Superficialis, and beneath this, but separated by sparse cellular substance, is the fascia known as the Cervical Fascia of Allan Burns,¹ or the Fascia Profunda, a laminated expansion which exercises a most important influence on the diseases of this region. This fascia, arising from the larynx, forms a thin capsule to the thyroid gland, and, being then closely attached to the inferior margin of the gland, descends to the sternum in two lamina, so as to form a perfect sheath for the sterno-hyoid and thyroid muscles. At its inferior extremity it is firmly attached to the sternum, sternal ends of the clavicles, and cartilages of the adjoining ribs, for about one inch below the upper edge of the breast-bone, thus forming an elastic and resisting membrane from the top of the sternum to the larynx. Directly above the sternum, it surrounds the *arteria innominata* and *brachio-cephalic vein*; and beneath it are the trachea, roots of the large arteries of the head and upper extremities, and the trunks of their veins, as well as important nerves.² Between these organs and the fascia there is much loose cellular substance filled with lymphatic glands, the former being liable to serous infiltration, and to extensive suppuration in the disorders of this and the adjacent portions of the neck. The external border of the *fascia profundi colli* is continuous with the sheath of the carotid arteries, whilst it and the *fascia superficialis* are united together along the anterior edge of the sterno-cleido-mastoid muscle.

The sterno-hyoid and thyroid muscles, on the median line of the neck, are the only muscles useful as points of reference in this region.

The Arteries are among the most important of the body. Counting from the sternum upwards, we find the *innominata* passing obliquely from left to right, and from below upwards. As it is only about eighteen lines in length, its position is limited chiefly to the supra-sternal fossa. Next to this may be mentioned the carotids which are in the lateral boundaries, and extend usually to a level

¹ Burns on the Anatomy of the Head and Neck.

² Special Anatomy and Histology, by Wm. E. Horner, vol. i. p. 378, eighth edition.

with the os hyoides without giving off any branches; but, on reaching this level, they give origin to the two superior thyroid arteries. These, in connection with the two inferior arteries of the same name, run to supply the thyroid gland and adjoining parts, and are the only arteries which can be especially referred to as restricted to this region.

The accompanying Veins are very numerous, being both superficial and deep-seated, and bring the blood from the thyroid gland and the surrounding organs into the jugular vein. The deep-seated veins have three principal directions: the superior follow the course of the superior thyroid arteries, and empty into the internal jugular vein; the middle come out at the sides of the thyroid gland, and also enter the internal jugular vein; but the sub or inferior thyroid pass down in numerous anastomoses towards the left subclavian vein, crossing the inferior portion of the trachea in an opposite course from that taken by the arteria innominata, and being also more superficial than this vessel. (Plate XXIX., Fig. 4.)

The superficial veins are more variable, and anastomose in various ways with the deep veins.¹

The variable size and direction of these veins renders a minute and accurate description of them impossible, though their position in regard to the operations of tracheotomy and others practised on this region would render it desirable. The surgeon should, therefore, be upon his guard, in all incisions made upon this part, and especially as he approaches the supra-sternal fossa. The relations of the veins and nerves connected with the course of the carotid artery, or those on the borders of this region, will be referred to hereafter.

The other tissues of this portion of the neck may be briefly mentioned at present in their relations to each other, as well as to those which surround them. Commencing with the skin, there may be noticed, first, a loose cellular tissue, on which it moves readily; a layer of the superficial fascia; an anterior layer of the deep fascia, with some veins; the sterno-hyoid and thyroid muscles; a posterior lamina of the deep fascia; the thyroid gland, covered by each layer of this fascia, and thus placed in a capsule; the larynx and trachea, with the condensed cellular tissue around them, which latter has been designated² as the tracheal fascia; then

¹ Blandin, *Anat. Topographique*, p. 191.

² Porter, *Surg. Anat. of Larynx and Trachea*.

PLATE XXX.

INSTRUMENTS EMPLOYED UPON THE ŒSOPHAGUS AND TRACHEA.

Fig. 1. Stomach-pump of Dr. Goddard.

Schiveley's pattern.

Fig. 2. Physick's Œsophageal Catheter for the evacuation of the contents of the stomach.

“ “

Fig. 3. Ordinary Œsophageal Probang.

“ “

Fig. 4. Œsophageal Hook and Probang of Dupuytren.

Charriere's pattern.

Fig. 4'. Œsophageal Hook of Dr. Nathan Smith.

After Smith.

Fig. 5. Blunt Hook, made of annealed wire, for the removal of foreign bodies from the œsophagus.

After Bond.

Fig. 6. Œsophageal Bougie for dilating stricture, employed by Dr. Horner.

After Horner.

Figs. 7, 8. Bond's Œsophageal Forceps.

After Bond.

Fig. 9. Sponge for cauterizing the Larynx, as advised by Trousseau.

Charriere's pattern.

Fig. 10. Instrument employed by Dr. Green for the same purpose.

Schiveley's pattern.

Fig. 11. Tongue Depressor; by which a patient can depress his own tongue without incommoding the operator.

Rohrer's pattern.

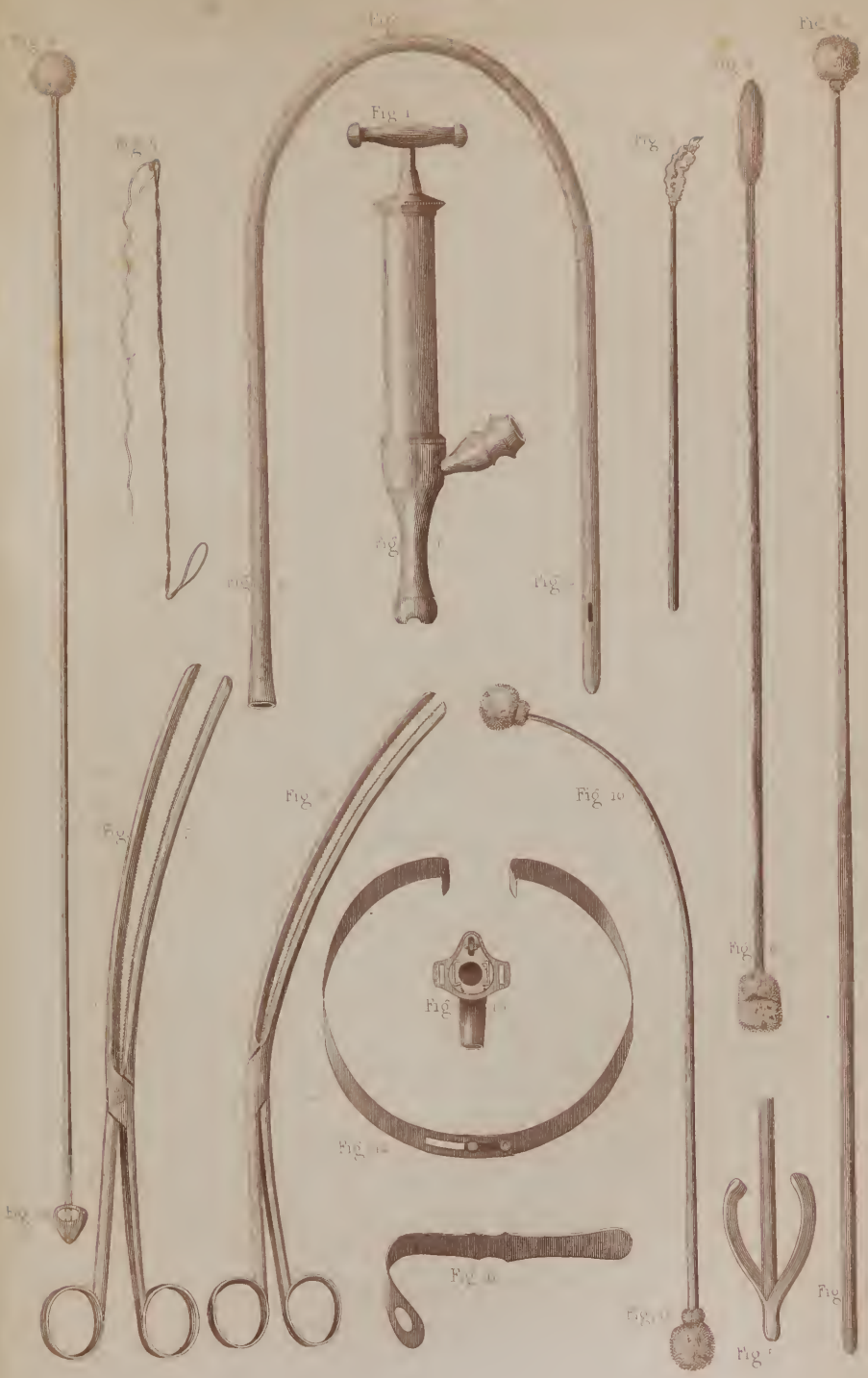
Fig. 12. A Ring made of watch-spring, so as to be readily adapted to any neck, and employed by the author to hold open the sides of the trachea after the operation of tracheotomy.

Schiveley's pattern.

Fig. 13. Ordinary tracheal tube or canula, intended to be placed in the trachea immediately after the operation of tracheotomy.

Charriere's pattern.

The objections to the employment of this tube have been stated in the text.



the œsophagus; and last, the muscles on the front of the vertebræ. In this enumeration, no reference has been made to the great vessels and nerves of the neck, as their relations, variable disposition, and arrangement, can be better understood in connection with the special operations practised upon them.

SECTION IV.

THE SUPRA-CLAVICULAR REGION.

At the base of the neck, immediately above the clavicle, being bounded internally by the posterior edge of the sterno-mastoid muscle, and externally by the anterior borders of the trapezius and splenius muscles, is the region designated as the supra-clavicular. Being triangular in its outline, with the base below, the clavicle, together with the trapezius, and sterno-mastoid muscles form its three sides. The skin and fascia covering this region, with a small portion of the platysma-myodes muscle, require little notice, as they present nothing of importance, and are chiefly noted by the surgeon as indicating the coverings that he may expect to find on tumors in this neighborhood. Of the numerous lymphatic glands situated about this part, some are superficial, and some deep-seated (Plate XXXIII., Fig. 1), as in other regions of the neck. When enlarged, the movable character of the swelling, and its greater development when superficial, will generally enable an operator to tell whether the tumor is seated above or below the fascia, a matter of much importance to decide when extirpation is contemplated.

The Arteries usually found in the supra-clavicular region are such as supply the upper extremities and the adjacent parts of the neck. Among the first is the Subclavian artery, which, in the course taken from its origin to its escape through the subclavius muscle (whence to the edge of the axilla, it is called axillary), forms a curve, the concavity of which surrounds the cul-de-sac made by the expansion of the pleura above the first rib.¹ The branches given off by the subclavian artery may be divided into those which run horizontally with, and those whose course is perpendicular to, the line of the clavicle. (Plate XXXIII., Fig. 1.) Among the first are the Posterior Cervical, which is two fingers'-breadth above the

¹ Blandin, *Anat. Topographique*, p. 206.

clavicle, the Superior Scapular, which runs close along the posterior margin of the bone (and is often in the way of the operator in attempting to ligate the subclavian), and the Transversalis Colli, all of which run towards the back of the neck and top of the shoulder; while the Vertebral, Inferior Thyroid, and others, coming off within the scaleni muscles, run more or less perpendicularly. The perpendicular arteries, constituting the Thyroid Axis, arise at the inferior internal angle of this region, or at the space which exists between the sternal and clavicular origins of the sterno-cleido-mastoid muscle.

The Veins follow the course of the arteries, being generally in advance of them, or between them and the skin. The Subclavian Vein, however, does not pass between the scaleni muscles, but in front of them.

The External Jugular Vein terminates towards the inner side of the supra-clavicular fossa, after receiving the superficial veins from the shoulder, by emptying into the subclavian vein in front of the scalenus anticus. Sometimes, instead of one trunk, there are two or three which unite at variable distances above the clavicle.

The Nerves of this region belong chiefly to the brachial plexus; the four lower cervical and the first dorsal forming a plexus, which is more or less closely connected with the subclavian and the commencement of the axillary arteries. (Plate XXXIII., Fig. 1.)

The other details of these parts will be given in connection with the operations practised on the artery.

In dissecting this region, the layers are usually presented as follows: First, the skin, then the superficial layer of the fascia, as well as the platysma-myodes muscle. Next, loose cellular tissue, containing numerous venous and arterial branches, the principal of which have just been referred to, as connected with the subclavian vessels. Around these vessels is a fibrinous expansion from the deep fascia, which forms for them a sheath, close to which is the cul-de-sac of the pleura, as it rises above the first rib. But the elevation or depression of the shoulder, by moving the inferior boundary of this region, will increase or diminish the apparent depth of the vessels, as well as relax or stretch the various layers which cover them.

CHAPTER II.

OPERATIONS PRACTISED ON THE PORTION OF THE NECK WHICH IS
ABOVE THE OS HYOIDES.

IN the portion of the neck above the os hyoides we find two regions, the Supra-Hyoid and Parotid, both of which may require surgical operations in order to relieve their different disorders. But as the importance of all the parts contained within the limits of the neck renders it difficult to make a selection of any one as specially worthy of attention, it has been deemed advisable to refer to these operations in the order which has been adopted as the plan of the work; and, commencing at the portion which is nearest the head, proceed from above downwards, according to the natural arrangement of the tissues. The surgical affections of the skin and fascia in this section of the neck, presenting nothing requiring special operative interference, the disorders connected with the salivary glands become the first subject to which attention should now be directed.

SECTION I.

OF THE DISEASES OF THE PAROTID GLAND.

The diseases of the parotid gland, independent of the affections of its duct of which mention has been already made in connection with the operations practised on the face, consist either in such simple departures from a healthy state as yield readily to medical treatment, or in such degeneration of the cellular tissue and proper structure of the gland as may necessitate its removal.

The position of several of the superficial lymphatic glands of the neck, and the enlargement consequent on their diseased condition, sometimes also creates such a tumor in the parotid region that any one who is not cautious in forming a diagnosis, or who does not accurately examine the anatomical relations of the surrounding structures, may readily be led to suppose the enlargement to be due to an affection of the parotid itself.

As caution is necessary in deciding on the structure involved in the tumors of this region, a guarded prognosis should always be given.

PATHOLOGY.—That the salivary glands, as a general rule, are less liable to abnormal deposits or to degeneration of structure than other glands, is a point on which most pathologists seem to agree. Velpeau¹ expresses the decided opinion that all malignant growths, when seated in the parotid or submaxillary gland, commence either by a deposit in the lymphatic glands incorporated with them, or by a change in the parenchyma of the glands themselves, rather than by a degeneration of the proper secretory portion. Whether this opinion is based upon microscopical examination, or is solely the result of close observation, it has a special value in connection with the question of the propriety of extirpating these glands when diseased, which should be noted; because, admitting that the deposit commences in the parenchyma of the gland, it is evident that it cannot long be limited to its original seat, but must encroach on the surrounding structure, so as either to cause its absorption or disintegration. In the case of parotid tumors, such a change must modify very materially the natural relations of the part, and marked departures from the normal condition may, therefore, be looked for when the removal of the diseased mass is attempted. Particles of a gland, which, in the original state, were separate and distinct, or very loosely attached, will often, when diseased, be found to be blended in one common mass; and portions which were deep-seated and difficult of access in health, prove to be superficial, in consequence of their close and condensed union with tissues nearer to the surface. It has, therefore, been noticed that a diseased parotid is often surrounded with a dense capsule, formed chiefly at the expense of the surrounding cellular tissue and fascia, whilst its conglomerate parts are so fused into one conglobate mass, that the deepest portion of the gland had been pried out from the styloid process in consequence of the attachment of the exterior of the tumor to the muscles and parts about the angle of the jaw, as I have seen in several instances of well-marked scirrhus. That surgeons have been misled in relation to the difficulties of the removal of this gland, from comparing the operation with that attempted on it in a state of health, is certain, and daily experience is now leading many to

¹ Méd. Opératoire, tom. 3^{me}, p. 644.

place confidence in the views of those surgeons of the eighteenth century who advocated the practicability of accomplishing by an operation the entire removal of a diseased parotid.

When, therefore, circumstances induce the belief that the removal of the diseased structure can add to the patient's days, the operation should be performed, as the entire gland has been extirpated beyond all doubt; though it should be remembered, in cases of malignant degeneration, that the patient will only be subsequently placed in the same condition with those who submit to an operation for the removal of a scirrhous or encephaloid deposit elsewhere.

§ 1.—EXTIRPATION OF THE PAROTID.

For many years, the removal of the parotid gland entire was a vexed question, the possibility of accomplishing it being denied by high authority, among whom were Boyer, Richerand, and others, who, though dead, seem yet to influence a few surgeons of the present day, there being some who continue to speak of the matter in terms of doubt, notwithstanding the most positive proofs of its feasibility and execution. Aware of the existence of these doubts, and yet fully aware of the error of those who entertained them, the late Dr. Geo. McClellan, of Philadelphia, exerted himself to prove that the extirpation of the parotid gland was not only justifiable, but also capable of being thoroughly accomplished; and to his skill and energy, more than to that of any other surgeon, is due, I think, the credit of having demonstrated the reasonable character of the attempt; whilst by recalling attention to the means of treatment advocated by Heister, Von Swieten, Garangeot, and others, who had preceded him, in Europe, he secured for the operation a degree of confidence which has since led to its more frequent performance.

Extirpation of the parotid gland was, however, an operation which had previously been frequently performed in the United States, being first done by Dr. J. Warren, of Boston, who, as early as 1798, removed the entire gland;¹ in 1805, Dr. McClellan,² of Franklin County, Pennsylvania, did the same thing; in 1808, it was also successfully performed by Dr. S. White, of Hudson, New

¹ Dr. John C. Warren, in MS.

² See Bibliography, p. 81.

York;¹ and in 1811, and 1814, and again in 1841, Dr. Sweat, of Maine, successfully repeated it.

But though it is evident from these facts that the operation was well known to a few, it was not until the time of Dr. Geo. McClellan (1826) that it was generally regarded as feasible, and that the difficulties attendant on the entire removal of the gland in a diseased state were found to be much less than those experienced in accomplishing the same end when it was in a healthy condition. Since this period, the removal of the entire gland has been successfully accomplished in numerous instances.²

OPERATION OF DR. GEORGE MCCLELLAN, OF PHILADELPHIA.—The patient, Dr. John Graham, at that time a student of medicine in Philadelphia, had a tumor in the parotid region, the removal of which had been attempted in Dublin, but desisted from, in consequence of the opinion of the surgeons engaged in it, that, as the parotid was involved, the attempt was unadvisable. Dr. McClellan, thinking otherwise, proceeded to the operation, February 27, 1826, as follows:—

OPERATION.—Two curvilinear incisions were made from a little above the zygoma to a point two and a half inches below the angle of the jaw, so as to include nearly the whole of the old cicatrix between them. After reflecting the integuments from the surface of the tumor, the dissection of the mass was continued down to the zygoma and masseter muscle in front, and to the cartilaginous tube of the ear and mastoid process behind. Being unable to dissect any further in these directions, progress was made beneath the tumor by burrowing under its lower edge. The posterior belly of the digastric muscle being then divided, the fingers passed readily under the whole body of the tumor, and an effort was made to wrench it from its bed, but without success. Before proceeding further, the trunk of the external carotid was insulated, just as it was entering the tumor together with the descending veins; and then, instead of cutting them across, they were torn out from the body of the tumor with the thumb and finger. An instantaneous gush of blood deluged the eyes and face of the operator; but, before a ligature could be placed around the vessels, the hemorrhage altogether ceased in consequence of the retraction and contraction of the lacerated vessels.

¹ Reese, Cooper's Dict., edit. 1849, p. 259. Article on Parotid.

² See Bibliography, p. 81.

After powerful and repeated efforts at wrenching, aided by an occasional use of the knife, to divide the strong bands of cellular substance, and some of the fibres of the styloid muscles which adhered to the tumor, the mass was elevated above the ramus of the jaw and the mastoid process. The trunk of the portio dura, which was very much enlarged, being then seen mounting over the posterior margin of the tumor, to enter its substance, was divided, and the upper portion of the tumor separated from the zygoma by the scalpel, as the layers of fascia were too strong to be lacerated.

In this step, the main trunk of the temporal artery was necessarily cut, and a profuse hemorrhage coming from the recurrent circulation, a ligature was placed on the vessel, this being the only one which was ligated during the operation. The internal maxillary was not discovered, having probably been ruptured in the act of wrenching the deep-seated portion of the tumor from behind the angle and ramus of the jaw. After waiting some time to see if hemorrhage would occur, the edges of the wound were united by three stitches of the interrupted suture, in order to prevent their being reflected inwards; adhesive strips, a compress and head bandage completing the dressing. The patient recovered, with less deformity than existed before the operation.¹ The gentleman is believed to be yet alive, and residing in the city of New York.²

OPERATION OF DR. VALENTINE MOTT, OF NEW YORK.—Determining to ligate the external carotid artery before attempting the dissection, the operation of Dr. Mott was commenced by an incision about three inches long, which was carried from the posterior angle of the lower jaw downwards and inwards, so as to lay bare the artery. Owing to the tumefaction, this vessel was found to be nearly three inches from the surface, and was tied immediately below the digastric muscle, or a little above the upper border of the thyroid cartilage.

An incision was next commenced above the jugum temporale, and carried downward in a semicircular direction, until it terminated upon the os occipitis, when the incision on the neck was extended upwards to intersect the one over the tumor.

On detaching the integuments in the form of a double flap, the gland was found in a melanotic condition. In order to free it, the

¹ New York Med. and Phys. Journ., vol. v. p. 650.

² See, also, Principles and Practice of Surgery, by the late Geo. McClellan, M. D., edited by J. H. B. McClellan, M. D., p. 335, note.

adipose and cellular tissue along the inner edge of the tumor was divided until the masseter was exposed. The finger being then introduced into the mouth and cut upon, in order to avoid the division of the buccal membrane, the tumor was separated for some distance from the masseter, to which it closely adhered, and then separated from the jugum which had become carious from pressure. The mass was next dissected entirely free from the digastric and masseter muscles, as well as from the angle of the jaw; but, as the patient complained of excruciating torture when the tumor was raised from below upwards, the dissection was continued from above downwards, and the adhesions being separated, with a few rapid strokes of the knife, from the capsular ligament of the lower jaw, the bulk of the mass was removed. The portion filling up the space between the styloid and mastoid processes was then cautiously detached with the handle of the scalpel and the portio dura rapidly divided. Several arteries were tied during the operation, and the trunk of the temporal yielded a profuse retrograde hemorrhage. After waiting to see if there should be further hemorrhage, the wound was dressed by sutures, adhesive strips, lint, a compress and bandage.¹

At first the wound did well, the ligature on the carotid separating on the fourteenth day, but the disease promptly showed itself, and the patient died of constitutional disturbance on the fifty-fourth day after the operation.

OPERATION OF DR. J. RANDOLPH, OF PHILADELPHIA.—The disease being seated in the left parotid gland, the head was inclined to the right side, and an incision made from the zygoma down to the edge of the sterno-cleido-mastoid muscle; a second one was then made at right angles to this, and the flaps dissected back. The facial artery being secured, an attempt was made to raise the lower edge of the tumor and to secure the carotid artery where it enters the gland; but this being very difficult, in consequence of the close adhesions, the tumor was dissected from its attachments, from above downwards. In doing this, the temporal and internal maxillary arteries with some smaller ones were secured, and the deep dissection being continued, the carotid was divided with the last adhesions of the tumor, and instantly secured by Physick's needle and forceps. The internal jugular vein was also cut and secured at each end.

¹ Am. Journ. Med. Sciences; vol. x. p. 17.

The operation lasted fifty-nine minutes; but little blood was lost; and Drs. Rhea Barton, William E. Horner, Norris, Coates, and others who witnessed the operation, all coincided in the opinion that the entire gland was extirpated.¹ Having aided Dr. Randolph in this operation, and subsequently had the charge of the patient, I am fully persuaded that he succeeded in removing the entire gland.

The wound healed readily and the patient left the hospital well, but about ten months subsequently I heard of his death from a return of the disease. The tumor is now in the Wistar and Horner Museum.²

OPERATION OF DR. WILLIAM E. HORNER, OF PHILADELPHIA.—A crucial incision over the centre of the tumor being freely continued along the base of the jaw, so as to include some enlarged lymphatic glands, and also down the neck in the course of the carotid artery, the flaps were turned back and the fibres of the platysma-myodes and the fascia of the neck freely divided. Commencing behind, the tumor was then dissected from the anterior edge of the sterno-cleido-mastoid muscle, to which it closely adhered, and, by working gradually forward, the gland, which was surrounded by a firm capsule, was gradually freed from its posterior and inferior attachments. The primitive carotid artery being then fairly brought into view by the progress of the dissection, was found to have been so much involved in the disease as to show considerable thickening of its coats, having the appearance of the vessel when injected in the subject. A ligature was therefore placed around it, nearly on a level with the larynx, but not tied, the upper and anterior attachments of the tumor divided, the artery tied, and the tumor removed from its deep adhesions. These were by no means as close as in the healthy condition, the adhesion of the tumor to the angle of the jaw having caused the exit of the gland from its deepest points. The division of the internal maxillary giving rise to considerable hemorrhage, the internal and external carotids were also tied, lest, in their patulous condition, recurrent hemorrhage should ensue through them also. The submaxillary gland, and the lymphatics leading to and adhering to the thyroid gland, were also removed, leaving the deep-seated parts of this region perfectly exposed; but, on a close examination, it was

¹ Am. Journ. Med. Sciences, vol. xxiii. p. 517.

² University of Pennsylvania, Philadelphia.

impossible to find either the internal jugular vein, or the par vagum, of this side. The wound was then filled lightly with lint; the flaps closed by sutures, and covered with adhesive plaster, compress, and bandage. On the eighth day all the ligatures separated spontaneously, and the patient started for his home six weeks after the operation.¹ When last heard from the disease had returned and caused his death by exhaustion.

STATISTICS.—Of eleven cases in which the parotid gland was extirpated by Dr. George McClellan, ten recovered from the operation, seven of whom were living in 1848, one died on the fourth day, from coma consequent on the ligation of the carotid artery, and one died three years subsequent to the operation.² Three cases have been operated on successfully by Dr. John C. Warren, of Boston;³ one by Dr. John H. B. McClellan, of Philadelphia, successfully, although the pneumogastric nerve was divided in the operation; and one each by Drs. Mott, Horner, Randolph, Nathan R. Smith, Wheeler, Shipman, Toland, Wedderburn, and J. Mason Warren. Three cases were also operated on by Dr. Bushe, of New York.⁴ The history of these cases is, however, too extended to permit more than a brief enumeration, though it is right to say that in all of them there was more or less of cancerous degeneration which had involved the entire structure, or which, if limited to the areolar tissue in the first instance, had produced such a change in the gland that the original growth could not be recognized. From the account of the operations furnished by Velpeau,⁵ it appears that there are over thirty-five cases of this operation in which it was reported that the entire gland was extirpated; though he seems to doubt the fact because of the rarity of degeneration of the salivary glands as a class. But this general statement when met by the positive assertion of the diseased condition of the gland, by surgeons and anatomists of good standing, and recognized as such even by Velpeau himself, only shows the diversity of sentiment that may arise, when surgeons have not seen the same cases. Walshe⁶ says, in speaking of this opinion, that "it is certain that scirrhus and en-

¹ Medical Examiner, vol. vii. N. S. p. 30, 1851.

² McClellan's Principles and Practice of Surgery, p. 332.

³ Dr. Warren in MS.

⁴ Bibliography, p. 81.

⁵ Velpeau, Op. Surg., by Mott and Townsend, vol. iii. p. 443.

⁶ Walshe on Cancer, p. 267.

cephaloid do occasionally originate in the parotid, and run their ordinary course."

As regards the possibility of accomplishing the extirpation of the entire parotid gland, there is therefore in my mind no doubt. The fact, however, is equally well established that the ultimate result to the patient in these tumors, where the tumor is of a cancerous character, will be found to correspond with the operations performed for the removal of malignant growths in other portions of the body.

REMARKS ON THE OPERATION.—In the descriptions of the operative proceedings of the distinguished surgeons just referred to, we see several varieties, each of them being more or less modified by the peculiarities of the case. Certain general precepts may, however, be applied to every instance in which the removal of the gland may be deemed proper.

1st. All external incisions should be free enough, *at first*, to enable the operator to work readily around the tumor.

2d. The tumor should be first loosened at its posterior part, then at its superior and anterior borders, and lastly at its inferior. Dr. Mott, however, prefers to commence below, but always ligates the carotid before commencing his operation.

3d. The attachments of the tumor to surrounding parts should be stretched or torn as much as possible, instead of being dissected, as the laceration prevents hemorrhage.

4th. The edge of the scalpel should be directed towards the tumor as much as possible.

5th. The external carotid artery should be taken up, as nearly below the tumor as may be necessary, at the moment of removing the gland from its deepest and inferior connections.

The propriety of ligating, or even of passing a ligature around the primitive carotid previous to acting on the tumor, is a question that the majority of operators have now decided in the negative; and, when it is remembered that, in some instances, the external carotid alone is cut, whilst the internal remains uninjured, and that, in others, the compression of the surrounding structures by the diseased mass has caused great diminution of the caliber of the vessels, or even their obliteration, this decision seems to be based on sound principles. In three instances, it has fallen to my lot to attend to the hemorrhage during this operation, and in all it was readily controlled by pressure upon the main trunk of the artery when the course of the dissection seemed likely to injure the ex-

ternal carotid, or by the direct application of the ligature to the divided end of the artery, when it was cut free from the tumor.

In the operation performed by Dr. Horner, and in that of Dr. John H. B. McClellan,¹ the internal jugular vein was entirely obliterated; and in the others that have fallen under my observation, the artery has either been much thickened in its coats or diminished in its caliber, the most troublesome hemorrhage having been that which arose from the recurrent circulation. The paralysis arising from division of the portio dura, in one case, was subsequently very much relieved, and in the others, during the short period when they were under my charge, did not produce as marked deformity as that created by the presence of the tumor. In a case reported by Dr. Warren, it had nearly disappeared a few months after the operation.² That the division of this nerve was the cause of the intense suffering, described by some of the earlier operators, is a point on which every surgeon of the present day must have his doubts, the pain then noted being doubtless due to the division of the branches of the third branch of the fifth pair, or of the cervical nerves involved in the disease. Dr. Mott, of New York, yet advises³ the following course, *e. g.*, that the carotid should always be tied first. He also recommends that an incision should be made in a vertical direction over the tumor in the course of its long axis, and that another should cross this, but not at a right angle; and that, after dissecting back the flaps, the operator should begin the separation of the gland from below, and not from the zygomatic arch. In connection with this operation, as well as in others upon the neck, he also cautions the surgeon against the dangers of the entrance of air into veins that may be wounded, and especially the jugular vein.

In reviewing the opinions thus stated in relation to the performance of the operation of extirpating the parotid gland, it may, I think, be safely said that, though the operation is one which involves a high responsibility, it is yet one which every good anatomist may succeed in performing. But whether, after accomplishing this much, the patient will be benefited for any long period, is a point which the statistics of operations for malignant growths elsewhere alone can settle. Certain it is that the removal of the tumor has often relieved the individual of the distressing neuralgic pains

¹ Principles and Practice of Surgery, p. 336.

² Warren on Tumors, p. 290.

³ New York Register of Med., vol. i. No. x. p. 153.

and œsophageal difficulties under which he formerly labored; and, as an euthanasial measure, or one capable of prolonging life for even a limited period, its propriety should, therefore, be calmly considered in every case where its performance may be demanded. My individual opinion is favorable to it when other general or local means have failed to check the progress of the disease.

§ 2.—RELIEF OF ENLARGEMENT OF THE PAROTID GLAND BY
OBSTRUCTING THE CIRCULATION.

In order to avoid the necessity of resorting to extirpation of the parotid gland in cases of scirrhus, various other local means have been tried, as leeches, friction, blisters, electricity, iodine, and pressure, though the latter can only be applied very imperfectly. Such means can, however, only act as palliatives. A more certain method of checking the development of the tumor, or inducing atrophy of its structure, will be found in the interruption of the supply of blood through the nutrient vessels of the parts, by ligating the carotid artery. This operation has been successfully performed, in two cases, by Dr. Alexander E. Hosack, of New York, and in a third absorption had visibly commenced.¹ In the first case, the patient was a woman aged fifty-five years, the tumor of considerable size, and of three or four years' growth, and had been treated with iodine internally and externally for two months, without benefit. After ligating the vessel, the tumor not only disappeared, but left a depression of the same form as the gland in its natural state.

But, in estimating the value of this operation, one difficulty certainly exists, and that is the utter impossibility of deciding whether the tumor is formed by the parotid. In one of the cases reported by Dr. Hosack, the account certainly justifies us in doubting whether the tumor was a cancer of the parotid, as these tumors are seldom very large; whilst if it was of the size of the encephaloid degeneration it would hardly have taken three or four years to have developed itself without inducing the death of the patient. When the tumor is formed of the parotid, or even the adjoining lymphatics, there would also be great difficulty in preventing the

¹ Cooper, *Surgical Dictionary*. Appendix, by D. Meredith Reese, M. D., article, Tumors. Also, Walshe on Cancer, p. 204.

return of the blood through the recurrent branches of the opposite side, even when the carotid was tied. As, under ordinary circumstances, any surgeon who could accomplish the ligature of the artery could also remove the tumor, and thus render the removal of the diseased structure certain; whilst under the use of anæsthetics he would cause his patient but little additional suffering, I should much prefer the chances of the extirpation in effecting a cure, or even temporary alleviation of suffering, to those presented in any other plan of treatment, except an appropriate constitutional one. When this had failed, I would certainly operate, if only to alleviate the patient's suffering, and enable him to obtain an easier death.

SECTION II.

OPERATIONS PRACTISED ON THE SUBMAXILLARY GLAND.

Owing to the remarks made in connection with the degenerations of the parotid gland, there is but little necessity to occupy much space in considering the disorders of this body. Like the parotid, the submaxillary gland is rarely, or never, the starting-point of malignant disease, whilst the lymphatics in its neighborhood are often involved. But, should circumstances induce the surgeon to attempt its excision, he may accomplish it by the following plan:—

OPERATION.—Direct the patient to shut the mouth and throw back the head, inclining it to the side opposite to that which is affected. Then, by any incision which is adapted to the size of the tumor, cut through the integuments, and dissect back the flaps thus created, so as to expose the disease. Applying two ligatures to the facial vein, and dividing the vessel between them, and also ligating the facial artery near its entrance into the gland, or near the jaw, pass a needle and ligature through the tumor, and forming a loop with the ligature, remove the needle. Then drawing upon the loop, either downwards and backwards whilst the dissection is prosecuted in front of the gland, or outwards and upwards when it is carried below and behind the gland, free the latter from its pouch, avoiding all injury to the surrounding parts, by directing the edge of the knife constantly towards the tumor, and keeping its adhesions upon the stretch, by drawing firmly on the loop of the ligature which was passed through it.

The other tumors of this region will be referred to in the chapter under diseases of the lymphatic glands of the neck, whilst the treatment of ranula has been placed among the operations of minor surgery.¹

CHAPTER III.

OPERATIONS PERFORMED ON THE LARYNX AND TRACHEA.

THE operations practised on this portion of the neck are cauterization of the larynx from the mouth, and the opening of the larynx or trachea, either for the removal of foreign bodies, or in cases of membranous croup.

SECTION I.

SURGICAL ANATOMY OF THE LARYNX AND TRACHEA.

The upper extremity of the Trachea or the Larynx is formed by five cartilages. These cartilages, of which the thyroid, cricoid, and epiglottis (Plate XXXI., Fig. 2) are the most important to the surgeon, as connected with the operations on this part, extend from immediately below the os hyoides and root of the tongue to the first ring of the trachea, being lined throughout by a mucous membrane, between which and the cartilaginous structure is a sparse cellular tissue, liable in certain forms of disease to dropsical or serous infiltration.

The trachea is four or five inches long in its entire length, though not more than two and a half inches in the portion which is situated between the top of the sternum and the cricoid cartilage. It is about nine lines in diameter, and composed of sixteen or twenty distinct rings, each of which is deficient in the posterior third, being completed in this portion of the canal, as well as united to each other by elastic ligamentous matter.

The tissues covering the trachea are the skin, superficial fascia,

¹ See Smith's Minor Surgery, third edition, p. 373.

sterno-hyoid and thyroid muscles, and deep cervical fascia, together with the thymus gland, which latter, or rather its isthmus, sometimes extends as low as the fifth ring. Beneath these parts is a cellular tissue immediately around the tube, which has been spoken of by Mr. Porter as the tracheal fascia, and which is liable to become emphysematous when an opening is made into the trachea, unless it is specially attended to. But the most important of the surgical relations of this portion are the numerous bloodvessels, whose varying position renders them especially troublesome to the surgeon. Between the isthmus of the thymus gland and the top of the sternum are usually found several veins. Of these, the superficial veins are found in front of the sterno-hyoid muscles (Plate XXIX., Fig. 4), and cause but little trouble in operating; but the plexus formed by the deep veins, and especially by the inferior thyroid, together with an artery (middle thyroid), all of which are behind the muscles, will be found to be frequent sources of trouble in tracheotomy.

There are also certain variations in the arrangement of the larger vessels of the neck which may embarrass the surgeon when operating on this part. Thus, the superior thyroid artery occasionally sends a large branch to the crico-thyroid ligament, and then turns down to supply the thyroid gland; sometimes the inferior thyroid arteries are given off by the primitive carotids on a level with the thyroid gland; or the left carotid may arise from the innominate and pass across the front of the trachea, as has been seen in several instances by Blandin.¹

As the trachea follows the shape of the vertebral column, it is most superficial at its upper portion, where the vertebræ are convex in front, but becomes deeper as it approaches the chest, so that near the sternum it is over an inch beneath the integuments, or even more in short, fat necks; whilst the changes produced by œdema, congestion, and the other consequences of disease of the windpipe, especially in children, frequently add to the depth of this canal from the surface of the neck, at this point.

¹ Anat. Topograph, p. 190.

SECTION II.

OPERATIONS UPON THE LARYNX.

The operations practised on the upper portion of the trachea consist in such as are required for the relief of inflammation of the part, and those demanded by the presence of foreign bodies.

§ 1.—CAUTERIZATION OF THE LARYNX.

The introduction of lunar caustic into the larynx is an operation which may be demanded in the treatment of various forms of inflammation, and especially in membranous croup.

The credit of suggesting and applying this remedy is due to M. Trousseau, of Paris,¹ who first introduced a strong solution freely into the canal, both by means of a sponge as well as by a syringe; whilst in the United States particular attention has been called to the advantages of its employment, by Dr. Horace Green, of New York.² The operation is simple, and may be readily performed as follows:—

OPERATION.—Place the patient before a strong light, with the mouth widely opened, and the head supported, and, depressing the tongue by any means that is found most convenient, pass the sponge directly into the larynx (Plate XXXII., Fig. 2) on either side of the epiglottis, and immediately withdrawing it, much less inconvenience will be caused to the patient than might have been anticipated.

The instruments adapted to this purpose may be seen on reference to Plate XXX., Figs. 9, 10, 11, and include both those of Trousseau and Green, the difference between them not being very marked.

REMARKS.—Cauterization of the larynx is an operation of so simple a character, that reference to it in these pages might seem unnecessary, were it not that it is an important preliminary step in the treatment of croup, and one that should always be employed

¹ *Traité de la Phthisie Laryngée et des Maladies de la Voix.* Paris, 1836. *Mém. de l'Acad., &c.*

² *Diseases of the Air-passages.* New York, 1846.

PLATE XXXI.

A VIEW OF THE OPERATIONS PERFORMED ON THE TRACHEA.

Fig. 1. A front view of the Surgical Anatomy of the Trachea. 1. Os hyoides. 2. Thyroid cartilage. 3. Thyro-hyoid muscles. 4. Crico-thyroid muscles. 5. Thyroid gland and veins in front of crico-thyroid ligament. 6. Rings of the trachea. 7. Common carotid artery. 8. Superior thyroid arteries. 9. Inferior thyroid artery. 10. Carotid artery, as divided. 11. Outline of the top of the chest. 12. Innominate artery. 13. Inferior thyroid vein. 14. Transverse vein.

After Bernard and Huette.

Fig. 2. Relative position of the Larynx, Trachea, and Bloodvessels. 1. Os hyoides. 2. Thyro-hyoid ligament. 3. Thyroid cartilages. 4. Crico-thyroid ligament. 5. Cricoid cartilage. 6. Trachea. 7. Internal jugular vein. 8. Transverse vein. 9. End of inferior thyroid vein. 10. Veins.

After Bernard and Huette.

Fig. 3. Relative positions of the great vessels concerned in operations near the top of the sternum. 1, 1. Internal jugular vein. 2, 2. Subclavian veins. 3. Subclavian artery. 4. Transverse vein. 5. Inferior thyroid vein. 6. External jugular vein. 7. Arch of the aorta. 8, 8. Primitive carotids.

After Bernard and Huette.

Fig. 4. A view of the operation of Tracheotomy, as performed by Mr. Liston. 1. The tenaculum inserted into the trachea. 2. Position of the bistoury in incising the rings. 3. Line and termination of the external incision.

After Liston.

Fig. 5. Extraction of a foreign body by Tracheotomy, the head being thrown back and lowered, so as to facilitate the gravitation of the object. 1, 1. Blunt hooks holding open the wound. 2. Hand of the surgeon in the act of extracting the foreign body, by drawing it upwards from the bronchia.

After Bourgery and Jacob.

Fig. 6. A front view of the position and mode of retaining a canula in the Trachea, as usually practised. 1. The incision. 2, 2. A tape attached to the wings of the canula and passing around the neck.

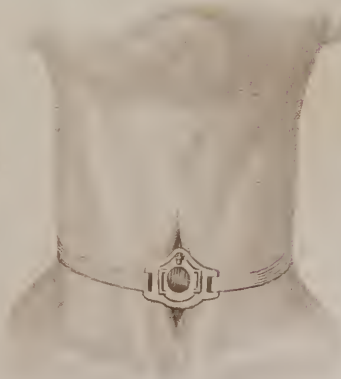
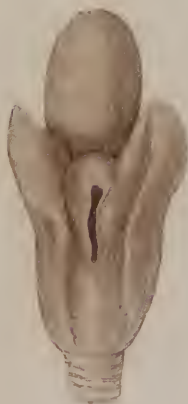
After Bernard and Huette.

Fig. 7. The appearance of the parts concerned in œdema of the Glottis. 1. The epiglottis cartilage, much swollen by serous infiltration of its sub-mucous cellular tissue.

After Gurdon Buck, Jr.

Fig. 8. The operation of scarifying the Glottis for the relief of œdema. 1. The forefinger in its position as a director. 2. The knife in the act of scarifying the part.

After Gurdon Buck, Jr.



before tracheotomy is resorted to. Although this remedy had been known to the profession for several years, incredulity, and a knowledge of the irritation usually created by the presence of even a small particle of any substance in the trachea, prevented very many in this country from attempting it; and there are yet to be found practitioners who deny the possibility of introducing a sponge into the glottis. To Dr. Green, of New York, is, therefore, due the credit of having done more than any other surgeon in the United States towards establishing professional confidence in an operation, which has since proved to be both easy and useful in many instances. The tendency to quackery, so often observed in the treatment of affections of the windpipe, dependent on chronic inflammation, has, however, shown itself in this as in other rational plans of treatment; and a measure which is capable of doing much good, when judiciously directed, seems now likely to be cast aside by many, on account of its liability to be misemployed. That the application of a solution of nitrate of silver has been resorted to in cases which did not require it, is doubtless true, but time will soon settle the positive and correct indications which should direct its use, and remedy the evils which always ensue upon the first employment of a *fashionable* remedy.

§ 2.—CEDEMA OF THE GLOTTIS.

PATHOLOGY.—In the rare form of disease of the upper extremity of the larynx, which has been designated as CEdema of the Glottis, there is commonly found an infiltration of the submucous cellular tissue of the aryteno-epiglottic cartilages, in consequence of the development of such a degree of inflammation, as results either in an effusion of pure serum, or of a gelatinous serum or lymph, or of pure pus, or of pus mixed with shreds of the membrane consequent on sloughing of the tissue, though this last condition is said to be rare. Owing to these changes, the mucous membrane lining the opening or edges of the cartilages at the top of the larynx, becomes distended and formed into folds, or doublings, which, rising upwards, and also extending downwards as far as the vocal chords (Plate XXXI., Fig. 7), render the epiglottis thick and stiff, greatly diminishing, or even closing the opening of the larynx, so as to prevent the entrance of air into the lungs.

Originally named by Bayle, in 1808, Œdema of the Glottis, this complaint has been described as if it were limited to that portion of the larynx which is anatomically described as the glottis, whereas it is really, as shown by Bouillaud and others, an œdematous inflammation of the larynx itself, consequent on, or accompanied by, a similar condition of the surrounding parts. Though often the result of the extension of inflammation from the pharynx to the larynx, this complaint sometimes occurs spontaneously, three out of the forty cases reported by Valleix having suffered from it whilst otherwise in good health; it is also most common during the convalescence from slow fevers or after pneumonia. In most instances, however, it is the result of an inflammatory affection of the laryngo-pharyngeal membrane, where it is expanded over the tonsils, uvula, or soft palate, at which points the membrane is seen increased in color, and accompanied by all the symptoms consequent on tonsillitis, though at other times it is unnaturally pale and swollen in this affection. Such a condition of parts, it is now believed, existed in the case of General Washington, who, without presenting marked symptoms of croup, yet died asphyxiated. That the difficulty of respiration in his case was not alone due to the angina, must be admitted by all who recall the anatomical relations of the parts; and as œdema of the glottis was not thoroughly understood at the period of his death, the explanation thus advanced is due to the observation of more modern pathologists, as may be seen by referring to the views of various writers on this subject.¹

Sometimes œdema of the glottis, instead of being an acute complaint, is merely a subacute affection, and is, therefore, difficult to recognize solely by inspection, in consequence of the natural appearance of such portions as can be discovered by the eye. Under these circumstances, the sense of touch should be most confided in, as it alone will often enable the surgeon to recognize the condition of the top of the larynx, and enable him correctly to appreciate the diminished state of an orifice, which has sometimes been so completely closed as scarcely to permit the passage of light into the trachea, even when it was removed from the body. Œdema of the Glottis appears to be much more common in males than in females, twenty-

¹ See *Cyclopædia Pract. Med.*, vol. iii., art. Laryngitis; *Dict. de Science Médicale*, tom. xvii.; *Pract. of Med.*, by George B. Wood, M. D., vol. i. p. 743.

nine out of the forty reported by Valleix¹ being males, and only eleven females. Without referring to the medical treatment which would be proper as preliminary to, or as an adjuvant of, the operation demanded for its relief, and, with the simple mention of the utility of tracheotomy as a last resort, this account will be limited mainly to the operation, and especially to the means employed, with great success, in several cases, by Dr. Gurdon Buck, Jr., of New York.

OPERATION OF DR. BUCK.—The patient being seated on a chair, with the head thrown back, and supported by an assistant, should be first directed to keep the mouth as wide open as possible, or if unable to do so, should have it kept open by means of a plug introduced between the molar teeth. The forefinger of the surgeon's left hand being then introduced at the right angle of the mouth, and passed down over the tongue till it encounters the epiglottis, the end of the finger may readily be made to overlap this cartilage by being carried above it, as there is usually no difficulty in drawing the epiglottis forwards towards the root of the tongue. The finger thus serving as a guide (Plate XXXI., Fig. 8), a curved knife (Plate XXXV., Fig. 15) should be conducted along it, the concavity of the instrument being directed downwards till its point reaches the finger nail. Then, by elevating the handle so as to depress the blade an inch or an inch and a half further, the cutting extremity will be placed in the glottis between its edges, when the instrument, being slightly rotated from one side to the other, so as to give it a cutting movement, may be made to incise the mucous membrane by withdrawing it from the larynx. After repeating this two or three times, on either side, without removing the finger, the margin of the epiglottis, and the swelling between it and the base of the tongue, as well as the margins of the larynx, will be freely scarified; or scissors curved flatwise (Plate XXXV., Fig. 16) may be used in the same manner. Though a disagreeable sense of suffocation and choking is at first caused by the operation, the patient soon recovers and submits to a repetition of the incisions after a short interval. In all the cases operated on by Dr. Buck, the scarification was performed twice, and in some instances three times, the hemorrhage which followed it being encouraged by the use of warm gargles.²

¹ *Mém. de l'Acad. Royale de Méd.*, tome xi. p. 121.

² *Transact. Amer. Med. Association*, vol. i. p. 137.

OPERATION OF LISFRANC.—The patient being placed in a similar position to that just referred to, a slightly curved bistoury with a long and narrow blade, guarded with lint to within one line of its point, should be held as a pen in the right hand. Then passing the first and second fingers of the left hand through the isthmus of the fauces to the œdematous swelling, pass the bistoury flatwise on the fingers down to the part, and when it has reached the larynx, turn its edge upwards and forwards, elevating or depressing the handle so as to make gentle pressure with its point, and scarify the tissue, when a little pressure of the fingers will readily evacuate the serum.¹

In milder cases, resort may be had to the use of the nitrate of silver.

CAUTERIZATION.—Dr. Horace Green, of New York, has obtained much success from cauterizing the parts with a strong solution of the crystals of the nitrate of silver, ᠑ij or ʒi to ʒi of water, and applied by means of the probang (Plate XXX., Fig. 10). A weak solution Dr. Green thinks is injurious, five or ten grains to the ounce only tending to increase the inflammation. His treatment is as follows:—

Apply the sponge probang wet with the strong solution first to the pharynx and top of the epiglottis, and after a delay of ten or fifteen minutes apply it freely to the base of the epiglottis and over the œdematous lips of the glottis. Repeat this application every hour or two according to the urgency of the disease and the effect produced by the operation, attempting each time to introduce the sponge into the glottis, which may be the more readily accomplished as the œdema subsides.² Should this fail to arrest the disease, resort must be had to Tracheotomy.

STATISTICS.—Of six cases reported by Lisfranc, five were cured. Of eight reported by Dr. Buck all terminated favorably, though in one, tracheotomy was also resorted to;³ and in six additional cases reported lately⁴ as occurring in the hands of Dr. Buck, or in that of other surgeons in New York, all were likewise cured. Dr.

¹ Malgaigne, *Operat. Surg.*, Philad. edit., p. 369.

² *Surgical Treatment of Polypi of Larynx and Œdema of Glottis*, by Horace Green, A. M., M. D. New York, 1852.

³ *Transact. Amer. Med. Association*, vol. iv. p. 277: 1852.

⁴ *Op. cit.*, p. 145.

R. A. Kinlock, of Charleston, has also lately cured one case by scarification, making twenty cures out of twenty-one cases.

M. Sestier, in a recent number of the *Archives Générales*, gives the result of 168 cases, of which 127 died. In 132 cases the ordinary treatment was adopted, and of this number 104 died. In 36 cases the operation of bronchotomy was performed, and of these 13 recovered and 23 died.¹

REMARKS.—Previous to the year 1821, there seems to have been no operation practised for the relief of this complaint excepting tracheotomy, though Dr. Marshall Hall had suggested the idea of scarification at that time. This suggestion was, however, generally discountenanced till Lisfranc, in 1823, resorted to punctures and pressure. His idea seems also to have been forgotten, or at least not generally resorted to, being viewed as a “fantastic operation,” until Dr. Buck, of New York, called the attention of the surgeons of the United States to the result of his operations. When we recollect the serious nature of the complaint, and the fact that, without opening the trachea, the danger of death is imminent, the benefits conferred upon society by such a paper as that of Dr. Buck, cannot be too highly estimated.

Among many points, on which he lays especial stress, is the means of diagnosis previously pointed out by the French writers, and especially by Tuilier, who proposed it in 1815, in his inaugural thesis.² In seven cases out of the eight treated by Dr. Buck, there was ample evidence to the touch of the puffy condition of the parts, and in the eighth there was no proof that they were not swollen. Of seventeen other cases which Dr. Buck has collected, the œdema was present in fifteen, giving in all of them the sensation of a soft pulpy structure. That a practice so long advised in severe cases of œdema of the limbs, should not sooner have been resorted to in a similar condition of so important an organ as the larynx, can only be explained by the fact that the true nature of the disease has only been accurately known within the last fifty years. As a substitute for tracheotomy, and as a rational means of affording relief from a distressing and dangerous complaint, the operation of scarifying the glottis and epiglottis may be regarded as one of the most useful of those suggested by the surgeons of the nineteenth century.

Cauterization is only likely to prove useful in the earlier stages.

¹ Charleston Medical Journal, vol. viii. p. 97.

² Dict. des Science Méd., tome xvii.

§ 3.—POLYPI IN THE LARYNX.

In a valuable monograph by Ehrman of Strasburg,¹ professional attention has recently been called to the occasional presence of polypi upon the laryngeal mucous membrane, in which he describes minutely a series of symptoms that have, perhaps, been more frequently seen than recognized, as similar symptoms have sometimes been noted without the observer being able to recognize the lesion which occasioned them. Although alluded to once in the United States, by Dr. Jno. C. Chceseman, of New York, in 1817,² few writers prior to 1850, seem to have investigated this complaint as thoroughly as Professor Ehrman, and the student will find in his work many practical details which want of space compels me to pass, with only this brief allusion. As this account must, therefore, be limited to operative details, I shall only furnish a synopsis of a case reported by Dr. Horace Green, of New York.³ In this case, the polypus was removed by excision, though generally laryngotomy has been employed in consequence of the difficulty of obtaining access to the polypus through the glottis.

OPERATION OF DR. GREEN, OF NEW YORK.—A young girl, ten years of age, after severe suffering, in connection with her trachea was found to have a white fibrous-looking polypus, the pedicle of which appeared to be attached to the left ventricle or left vocal ligament, as it could be seen when the tongue was firmly depressed and the patient coughed and gagged. This polypus being indubitably recognized, Dr. Green proceeded to excise it by seating the girl in a good light, with the head firmly held back by an assistant, whilst he depressed the tongue until the epiglottis was in view. Then gliding a slender double hook down to the tumor, when raised by the patient's efforts to cough, he fished it up, and after one or two attempts, succeeded in slicing it off from its pedicle by cutting it from behind forwards by means of a probe-pointed knife with a strong handle and a delicate slender blade. Some coughing followed, and a few drops of blood, but this soon passed away, and the young lady has for several years enjoyed excellent health.

¹ *Histoire des Polypes du Larynx*, 1850.

² *Transact. Physico-Med. Society*, New York, vol. i. p. 413.

³ *On the Surgical Treatment of Polypi of the Larynx and Celsa of the Glottis*.

REMARKS.—In a paper by Dr. Gurdon Buck, Jr., of New York, read before the American Medical Association in 1853, and published in volume six of their *Transactions*, it is shown that the cases of pediculated polypi of the larynx similar to the above are very rare; but Dr. Buck, whose experience in this disease has probably been the most extended of any surgeon in the United States, regards the operation of Dr. Green as especially well calculated for their relief, and as highly creditable to the operator. In the majority of the cases the morbid growths are, however, more extended in their base, and seated lower in the larynx, requiring the performance of laryngotomy for their relief. The method of treating them will therefore be found in the account of this latter operation.

The prognosis of the disease when left to nature is almost always a fatal one, and the chances of an operation, except as a means of prolonging life, are also very slight, only two, that of Ehrman, and that of Green, having recovered out of six, operated on.

§ 4.—TRACHEOTOMY.

The perforation of any portion of the trachea by means of a cutting instrument, with the view of affording a new passage for the entrance of air into the lungs, has long been designated as Bronchotomy, though, as the opening is limited to those portions of the trachea which are above the sternum, the term Tracheotomy is now more generally employed. Either may, however, be used to designate the operations practised on the larynx or trachea proper, the opening of the larynx being, however, frequently spoken of as Laryngotomy. As the operation of opening the windpipe varies a little, according to the point operated on, the steps of each operation may be best described separately.

I. TRACHEOTOMY FOR CROUP.

The operation of tracheotomy dates back to a very early period, Antyllus, A. D. 340,¹ having recommended and performed it in several instances. It has also been performed at various times, and

¹ See History of Surgery, Part I., p. 18, of this volume.

in different manners, solely in order to meet the peculiar views of the operator. To specify all these methods would, however, be a useless task, and I shall, therefore, limit myself to such a general plan of proceeding as may be advantageously resorted to under most of the circumstances which demand this operation.

This plan having been first brought to my notice in a paper by Dr. Joseph Pancoast, of Philadelphia,¹ and since then frequently repeated by him, as well as tested by myself, has been selected as presenting a methodical course of proceeding, as well as one which opens the trachea perfectly without unnecessarily exposing the patient to risk from hemorrhage, or to the subsequent inconvenience caused by the use of the canula.

PRELIMINARY MEASURES.—When the operation has been decided on, prepare a sharp scalpel; two curved spatula or blunt hooks; a director; one straight, sharp, and one probe-pointed bistoury; dissecting forceps, and dressing forceps, if it is intended to remove a foreign body; a tenaculum or a pair of torsion forceps; sharp-pointed straight scissors; threaded needles; ligatures, and several small pieces of sponge attached to sticks or quills as handles, as well as one or two pieces of sponge, cold water, and towels, together with such other articles as may be demanded in the dressing.

OPERATION OF DR. PANCOAST.—Place the patient upon his back, with the head thrown sufficiently backwards over a pillow, yet not so as to stretch it too much, or compress the trachea by contracting the muscles in front of it.

Then, whilst standing on the right side of the patient, let one assistant steady the head (Plate XXXI., Fig. 4), another confine the arms and steady the shoulders, a third attend to the lower limbs, and a fourth hand sponges, &c., as needed; or if the patient is a child, bind its arms to the body by inclosing them in a folded sheet or towel, so that one person may be able to hold it.

In commencing the operation, place the fingers of the left hand upon the skin near the median line, so as to steady it, and make an incision from the inferior part of the larynx down to near the top of the sternum, so as to cut only through the skin, or puncture a transverse fold of the skin when raised by the assistants and cut from within outwards, and then raising the fascia superficialis on the forceps, puncture it and slit it upon a director to the full

¹ Amer. Journ. of Med. Sciences, vol. xvii. N. S. p. 307.

extent of the external wound. After finding the line of junction of the sterno-thyroid muscles, separate them with the handle or back of the knife, by tearing the cellular tissue between them, and have them held back by curved spatulæ so as to expose the parts beneath, when the isthmus of the thyroid gland, if found to come so low down as to be in the way of the incision, should be tied by means of two ligatures passed beneath it by needles, after which it may be divided between them. At this time the venous hemorrhage from several points of the wound will often demand attention, and such vessels as can be seen should therefore be ligated. Then, pushing aside the two inferior thyroid veins, or ligating any anastomosing branches, or the middle thyroid artery if it exists, divide freely the condensed cellular tissue, which has been called by Mr. Porter¹ the Tracheal Fascia, and dissect a small portion of it from around the contemplated opening of the trachea, in order to prevent the parts from subsequently becoming emphysematous and closing the orifice. The trachea being now freely exposed, and the bleeding checked, a tenaculum may be inserted in the median line of the rings (Plate XXXI., Fig. 4), and the part thus raised excised by sharp-pointed scissors; or a bistoury may be at once passed in, and the trachea slit open from below upwards, to the extent of three or four rings, counting from the second; after which, the wound may either be kept open by means of a dilator, as proposed by Trousseau, or by bending a piece of lead or pewter, so as to enable it to pass round the neck, and be attached to the sides of the wound, as suggested by Dr. Pancoast, of Philadelphia, or by resorting to what I have found to be a neater instrument, viz., an elastic ring of broad watch-spring, which may be readily adapted to any neck simply by turning the pivot that holds the two halves together. (Plate XXX., Fig. 12.) The introduction of the old-fashioned canula into the trachea is, I think, so objectionable, that it may suffice at present simply to mention it, though, for the instruction of such as desire to employ it, I have added a figure to show how it is to be retained in the wound (Plate XXXI., Fig. 6). But whether the cartilages are trimmed so as to leave an opening, as advised by Messrs. Lawrence and Porter, of England, or simply incised, the use of the blunt hooks, or the watch-spring, will always prove serviceable by keeping the soft parts from contracting and closing the orifice in the trachea, as is very apt to be the case when the rings

¹ Surg. Anat. of Larynx and Trachea.

are merely divided without excising any portion of them; but as soon as the parts are sufficiently retracted, which happens sometimes in thirty-six hours, the hooks or springs should be removed.

AFTER-TREATMENT.—The operation having been promptly performed, the next most important point is the after-treatment, as on this depends the success of the operation. To one familiar with the pathology of croup, this will of course be simple, and may be summed up in the employment of such measures as would generally be useful in relieving inflammation of the throat. As it is, however, of importance that there should be no error on the part of the operator, I will briefly state the means that are most likely to contribute to the success of the operation. The temperature of the chamber should always be closely watched, and seldom permitted to sink below 80° Fahrenheit, as the air will now enter the lungs through the orifice in the trachea, without having been previously warmed in the mouth and nose. The atmosphere should also be kept moderately moist by a vessel of boiling water or vinegar and water being so placed as to favor the evaporation of its contents. Then, if the trachea continues to be filled with the false membrane usually seen in membranous croup, it may be lightly touched *once*, with a camel-hair pencil wet with a solution of the nitrate of silver \mathfrak{Dj} to $\mathfrak{3j}$. The frequent resort to this solution after the operation, though once practised, is now seldom employed, as Trousseau has lately discountenanced it. When the edges of the wound and the trachea become dry and disposed to crusts, it will be found useful and agreeable to the patient to paint both surfaces with glycerin and water, the constitutional treatment being as carefully pursued as it would have been before the operation was performed. The object of the surgical treatment of croup, it should be remembered, is merely to gain time for the efforts of nature to effect the cure, the life of the patient and the success of the operation being almost entirely dependent upon the remedial measures otherwise employed.

II. TRACHEOTOMY FOR THE REMOVAL OF A FOREIGN BODY.

The performance of tracheotomy, for the removal of a foreign body, differs in no way from the operation just referred to in connection with croup; but the following plan being presented in

connection with a case of this kind, and showing the results of a prompt incision into the trachea in order to check venous hemorrhage, is related in order to enable an operator to make a selection. The chief difference between this and the preceding operation will be found in the fact that Mr. Liston does not advise delaying the opening into the trachea until the hemorrhage is arrested, as is done in the method of Dr. Pancoast and others.

OPERATION OF LISTON.—In a patient, five years old, who had swallowed a small glass seal, the operation of tracheotomy was performed by Mr. Liston, as follows:—

The patient being securely fastened by a large sheet, wrapped several times round the body and arms, and closely pinned, was held by an assistant horizontally with his face upwards, and his head between the operator's knee. The preliminary incisions being made as usual, the blood gushed out freely from the veins, which were greatly distended by the efforts of the child and the difficulty of breathing, but none of these were tied. After waiting a few seconds till the first rush of blood had somewhat abated, the trachea, which was never still for a moment, rising and falling rapidly with the hurried movements of respiration, was seized by means of a small hook, and drawn forwards towards the mouth of the wound. (Plate XXXI., Fig. 4.) The scalpel being then entered at the lower extremity of the incision, with its point directed upwards and its back towards the vertebral column, with the handle kept low, and with a light hold of the instrument, so as to avoid injuring the œsophagus by any sudden movement of the patient, two or three of the rings were divided, and the assistant immediately directed to turn the child over with his face downwards. For an instant, the little patient seemed on the point of suffocation, as the first inspiration drew in a certain quantity of blood, which could not be prevented from flowing; but the next moment, by the change of position, the blood trickled on the floor, a deeper inspiration was taken, the foreign body was expelled with force, and, as if by magic, the breathing became quiet, and the venous hemorrhage ceased spontaneously.¹

REMARKS.—In this mode of operating, the great object seems to be to open the trachea promptly; but, unless in cases of threatening suffocation, as from the introduction of a piece of meat into the windpipe, there is no occasion for such haste. In removing other

¹ Lectures by R. Liston, with additions by T. D. Mütter, p. 326.

foreign bodies, it sometimes happens that the opening of the trachea produces such violent coughing as ejects the article solely from the efforts of the patient; but in others its escape is by no means so easy or certain as in the case just detailed. Not unfrequently it becomes necessary to remove it by means of narrow forceps (Plate XXXI., Fig. 5), though sometimes, and in my opinion most frequently, it remains for days and weeks, being subsequently thrown up in a spasmodic attack of coughing. In some of these cases, the performance of tracheotomy has been beneficial; but in others the patient has not derived such relief as would justify the operation. Caution in diagnosis and prognosis is, therefore, a matter of much importance with patients who are thus situated.

III. TRACHEOTOMY FOR EPILEPSY.

The suggestion of Dr. Marshall Hall, to relieve one of the forms of Epilepsy (Laryngismus) by opening the trachea, seemed at one time likely to lead to the frequent performance of the operation of tracheotomy. Notwithstanding the able arguments adduced in support of this theory by its accomplished author, the profession have not generally coincided in its propriety, and many have even regarded it as unjustifiable. In several of the patients on whom the operation has been performed, the disease was only checked temporarily, as had often been previously noticed after accidents or other events calculated to make an impression on the nervous system of the epileptic. Some of those operated on, in accordance with the suggestion of Dr. Hall, have either had a return of the disease or died, notwithstanding the existence of an opening in the trachea, through which air was freely transmitted to the lungs; and in a paper read by Dr. Radcliffe, of London, before the London Medical Society, the opinion is expressed "that the convulsions have been almost uniformly as bad as ever" after the operation. Many members of the Society doubted, therefore, whether tracheotomy was beneficial in this complaint.¹ In a case recently operated on in Philadelphia, by Dr. Jno. Neill, the patient died with the tube in the trachea.²

¹ London Lancet, 1853.

² See Bibliography, p. 88.

IV. LARYNGOTOMY.

Laryngotomy may be demanded by very much the same circumstances as those which indicate the propriety of performing Tracheotomy, but the former operation is less frequently employed than the latter, in consequence of the greater risk of hemorrhage in its performance, as well as the subsequent effects upon the voice. It may be performed thus:—

OPERATION OF DESAULT.—After dividing the skin and fascia superficialis by an incision which extended from the projecting angle of the thyroid cartilage to a little below the cricoid, but not near so long as that required in tracheotomy, Desault separated the thyroid muscles, placed his forefinger on the crico-thyroid ligament, and feeling for the artery of the same name, endeavored to depress or raise it out of the line of the incision, and then plunging the scalpel into the ligament, cut it either upwards or downwards, according to the position of the vessel.

When the incision is continued down through the cricoid cartilage and first rings of the trachea, it constitutes the operation which has been designated as laryngo-tracheotomy. In bad cases of Polypi in the Larynx, it may also be necessary to prolong the incision upwards to the os hyoides, as was done by Dr. Buck, of New York, in the operation which is hereafter quoted.

V. LARYNGOTOMY FOR THE REMOVAL OF POLYPI IN THE LARYNX.

In two cases reported¹ by Dr. Gurdon Buck, Jr., of New York, the operation of Laryngotomy, as recommended by Prof. Ehrman, of Strasburg, was performed, and with considerable relief.

OPERATION OF DR. GURDON BUCK, JR., OF NEW YORK.—The patient being seated before a window, in a low arm-chair, with the head thrown back and the front legs of the chair raised about three inches, on blocks, an incision was made for about four inches in the median line of the neck, dividing the skin and subjacent tissues till the laryngeal cartilages and the three upper tracheal rings were laid bare, the latter being done partly by lacerating and partly by de-

¹ Transact. Amer. Med. Association, vol. vi. p. 509, 1853.

pressing the isthmus of the thyroid gland. The hemorrhage having ceased, the crico-thyroid membrane was incised, and the incision continued upwards in the median line, with the greatest precision, throughout the whole extent of the thyroid cartilages, the division being made with the scissors in consequence of the ossification of the cartilages. The section being then continued through the cricoid cartilages and the exposed rings of the trachea, the sides of the larynx were stretched apart with retractors, thus exposing the polypus growth attached to its lateral walls. On snipping off the polypus the hemorrhage (which was of short duration) was absorbed by pieces of sponge held in the forceps, and the blood thus prevented from flowing into the trachea. A portion of the two upper rings of the trachea being now removed on either side, the tracheal tube was introduced, fastened by a tape passed round the neck (Plate XXXI., Fig. 6), and the respiration thus rendered easy and comfortable. The wound subsequently healed kindly around the tube, which was changed once in twenty-four hours, and the patient soon found that by closing the outer orifice of the tube she could breathe through the nostrils, and also blow her nose. The disease having reappeared after three or four months, a second operation was performed, the incision being carried along the median line, from the upper margin of the opening occupied by the tube, to within one inch and a half of the chin, so as to expose the whole of the larynx and os hyoides. It was also extended downwards one inch below the opening for the tube, when it was removed and the larynx split open to its whole extent. After overcoming many difficulties in removing as much as was possible of the tumor, the wound was closed by three sutures above the tube, when the latter was replaced. The subsequent changing of the tube often caused considerable hemorrhage; and, the tumor again becoming developed, a third operation, of a similar character, was performed. This wound also healed kindly, but the difficulty in removing the tube was again experienced; and the disease again progressed, though the patient did not die until nearly fifteen months after the first operation, without which, Dr. Buck supposes, she could have lived but a short time. In employing the tracheal tube, Dr. Buck advises that it should be made with a large opening on the convex side of its curve, in order to permit the use of the voice and the expulsion of matter from the trachea when the outer orifice is closed.

§ 4.—ESTIMATE OF THESE DIFFERENT OPERATIONS.

Tracheotomy presents so few dangers that are not equalled by the operation of laryngotomy, and has, in several diseases, so many additional points of recommendation, that the latter is but seldom resorted to. In selecting a mode of operating, preference may, it is thought, be justly given to that employed by Dr. Pancoast and others, and described at the commencement of this section. The advantages which I think it possesses are, first, less risk of hemorrhage in consequence of the surgeon lacerating the parts about the median line of the muscles, instead of dissecting them, as well as from his ligating the isthmus of the thyroid gland previous to incising it; second, the preservation of the opening in the trachea without irritating its lining membrane, or resorting to an instrument that exposes the patient to the risk of suffocation by its escape from the wound, or clogging with the secretions of the part; and, third, the power of looking into the windpipe, and judging accurately of its condition, or of applying remedies to correct it, if desirable. Indeed, much of the success which has attended this operation in the hands of Trousseau, Dr. Pancoast, and others, seems to have been due to their judicious after-treatment; a few drops of a solution of the nitrate of silver, ten or twenty grains to the ounce of water, being dropped in or applied upon a little probang, or the trachea itself swabbed out by a similar instrument whenever the clicking sound of the respiration led to the belief that false membrane or mucus was collecting at this point.

The excision of even a small portion of the rings of the trachea, in order to aid in preserving the opening, has been objected to by some surgeons as being likely to cause a subsequent contraction of the canal when the wound cicatrizes. But in the cases which have recovered, both in the hands of Dr. Pancoast, of Philadelphia, H. J. Bigelow, of Boston, and in those reported by others, this has not been the case. In Dr. Bigelow's case,¹ after employing a tube two days, it was deemed better to remove it, and excise a portion of the tracheal rings, and subsequently a dilator of wire was kept at the orifice of the wound.

The points especially worthy of notice in the performance of

¹ Am. Journ. of Med. Sciences, vol. xxvi. N. S. p. 81.

tracheotomy may then be summed up as follows: 1st, to lacerate and stretch, rather than dissect the parts about the trachea; 2d, to check all hemorrhage by the ligature before opening the canal; 3d, to clear away the cellular substance (tracheal fascia) around the proposed opening; and, lastly, either to excise a portion of the rings, or keep the wound and orifice in the trachea distended by a spring, or by hooks. (Plate XXX., Fig. 12.)

To those not familiar with the details of this operation, it may also be useful to state that the puncture of the trachea generally brings on a most violent and convulsive cough, during which little or nothing can be done. This, however, usually passes off as soon as the first stimulus of the cold air ceases to be felt. When, then, an incision is to be made into the trachea, it should promptly follow the puncture of the knife, or if a tenaculum is inserted, in order to favor the removal of a portion of the rings, their excision should be quickly effected after the hook is introduced, the violence of the cough consequent on the puncture being sometimes so marked as to alarm the bystanders for the life of the patient.

It is now doubtless apparent, from reading the above estimate of tracheotomy, that I regard it as an operation requiring some skill and preparation on the part of the surgeon, and that it should not be attempted by any practitioner, unless totally regardless of consequences. No matter how simple the operation may appear upon the dead subject, or upon the healthy adult, it will often prove to be a difficult one when the vessels are rendered turgid by dyspnoea, or when it is to be performed on the short, fat neck of a child, or when it is resorted to on a patient apparently at the last gasp, whose larynx and trachea are actively raised and depressed at every respiration. To the experienced surgeon such facts are well known, but to those who have judged of the operation solely from its performance in the dissecting-room, such statements should create caution and lead them to anticipate difficulties, if they are induced to operate. In all cases, special precautions should be taken in regard to hemorrhage, as, in some instances, the flow of blood has been of the most alarming and intractable kind. Desault,¹ whose skill no one can doubt, was, it is said, compelled to give up an operation, on one occasion, in consequence of hemorrhage; and Recamier has advised surgeons to defer opening the trachea for several hours, lest the

¹ Dict. de Méd., tom. vi. p. 58.

patient should suffer from a flow of blood. Roux, also, is reported to have saved one of his patients from the suffocation caused by the blood escaping into a trachea which had been promptly opened in hopes of arresting it, only by placing his own mouth to the wound and sucking it out. In a recent number of the *Gazette des Hôpitaux*, as translated by Dr. Fraser, and published in the *Transylvania Medical Journal* for June, 1853, is also an account of a discussion on Tracheotomy in the French Academy of Medicine, in which the serious character of the operation is admitted both by Guersant and Boyer. When, therefore, tracheotomy is spoken of "as an operation not much more difficult than venesection," the opinion should be received with some hesitation, as it may be the result of the want of experience of those who utter it.

Supposing, however, that the operator is aware of these dangers, and it is admitted that they are not universally encountered, the question which has of late years occupied so much of the attention of surgeons yet remains to be decided, to wit, Should tracheotomy be resorted to for the relief of all patients who are liable to die asphyxiated? That such a recommendation cannot be universally admitted requires no argument, and the proposition may, therefore, be more definitely settled by showing in what cases the performance of this operation may be advisable.

That an opening may be made into a healthy trachea for the removal of a foreign body, or in order to overcome a spasm of the glottis caused by inhaling a noxious vapor, or in cases of œdema of the glottis, is a point which I cannot but regard as settled by statistics. From an examination of the various papers referred to in the Bibliographical Index,¹ as well as from a review of many of the works upon Surgery, from a very early period, I am induced to think that tracheotomy, in such cases, is not only a justifiable operation, but also one which furnishes the patient with a ready means of escape from the dangers likely to ensue. And although instances are recorded where even nails and coins have remained in the wind-pipe for years, and even in the lungs, without destroying life, there are others, well authenticated, where the presence of a small bean, or of a grain of coffee or of corn, have induced laryngeal phthisis, ulceration, and death. In œdema of the glottis, though the operation of tracheotomy may be required, I would not resort to it until

¹ See Bibliography, p. 84.

scarification of the parts had been fairly tried; but this being done, I should anticipate from the operation prompt and permanent relief. In hydrophobia, I should certainly be disposed to try it rather than see the patient die without the operation.

As to the propriety of advising tracheotomy in cases of membranous croup, there is apparently so much of the result that might be charged to the peculiarity of the mode of operating heretofore employed, and to the delay that has generally preceded its performance, that the decision of the question must be considered as "sub judice." By referring to the statistics hereafter quoted, an opinion of the success of the operation, as usually performed, may be readily obtained, and it is one which has gone far towards diminishing professional confidence in this operation as a means of treating croup. Very many of the best surgeons at different periods, have, in their day, doubted its propriety or only advocated its performance at the last moment. In the United States, the experience of Dr. Physick was adverse to it; and in Boston, the opinion of some of the profession is at present opposed to its performance, as I notice no reply was given¹ to the question proposed by Dr. Storer, of Boston, to the members of the Society of Medical Improvement, whether "Tracheotomy had ever been successfully performed in that city in membranous croup?" More extended statistics, as collected for this volume,² also show that the prognosis of the operation, as heretofore performed, should be very guarded.

In most of the cases as yet reported, tracheotomy has, however, been deferred until the complaint had existed some time, and the inflammation progressed from the larynx into the trachea, or induced congestion of the lungs, or augmented the dangers from the incisions, by causing engorgement of the vessels of the neck; whilst in others there was an unhealthy condition of the lining membrane of the trachea at the point operated on, or sometimes sloughing of the wound, and constant irritation from the changing of the tube employed to preserve the opening in the trachea. Until then we can acquire such statistics as will show that in the cases operated on at an early period after a positive diagnosis of membranous croup has been made (and operated on so as to leave an opening which by the use of glycerin would not be liable to clog with mucus, whilst it is also kept free from the continued irritation of a

¹ Amer. Journ. Med. Sciences, vol. xxvi. N. S. p. 81, 1853.

² See page 473.

tube, by the use of the hooks (Plate XXX., Fig. 12) or ring), the deaths correspond with the mortality under the former mode of operating, this question cannot be regarded as settled. Cauterization of the pharynx and trachea through the mouth, together with early depletion, calomel and emetics, have saved many cases of true membranous croup, and will, consequently, be a strong argument against the performance of an early operation. But when croup occurs in those who are hereditarily predisposed to it, or when other members of a family have died from it, I would advise an early operation, and anticipate more success from it than I should from medical means alone, provided the operation was resorted to before the inflammation had reached the portion of the tube which was to be opened, and the wound in the trachea was kept open, either by the hooks introduced upon its sides, or if that was not sufficient, by their being placed upon the edges of the rings themselves. The chief difficulty here, is to designate any signs which would indicate that inflammation of the tracheal membrane had not gone too far, since auscultation furnishes no evidence that can be relied on, De La Berge and Moneret¹ citing one case, in which, though the vesicular murmur was extremely pure and heard everywhere, yet during the operation a false membrane was drawn out which represented the trachea and division of the bronchia; and Dr. Wm. Pepper, of Philadelphia, having also reported² one similar case, and another in which, though the respiratory murmur could not be heard, yet the exudation was strictly confined to the larynx. The only test that I know of is the one recently suggested³ by my friend, Dr. J. Forsyth Meigs, of Philadelphia, in which he states that in some patients the pulse was much less rapid when the disease was limited to the larynx and trachea than it was when it had invaded the bronchia. In two cases involving the bronchia the pulse counted 140 to 150 for several days prior to death, whilst in two others in which only the larynx and trachea were diseased, as shown *post mortem*, it counted only 120 or 130. In the case reported by Dr. Pepper, in which the disease was found after death to be confined to the larynx, the pulse was also only 120 the day preceding its termination. Dr. Meigs also suggests

¹ Practical Treatise on Diseases of Children, by J. F. Meigs, M. D., 2d edit. p. 111, Philad. 1853.

² Summary Trans. College of Physicians, Phila., vol. iii. p. 106.

³ Am. Journ. Med. Sciences, vol. xvii. N. S. p. 332, 1849.

that the signs of asphyxia will have existed longer and come on more slowly and gradually when the bronchia are diseased than they will in those in which these tubes are not involved. He therefore advocates the operation in hopes of saving some who would otherwise certainly perish. Although I am not so sanguine as he is in regard to the frequent success that might ensue if the operation of tracheotomy in croup was performed at an early period, I think that it would be justifiable in many cases, and especially in those with a pulse not above 120; but I would not advise it in any patient with croup in whom the asphyxia was threatening, and the blood had ceased to be well aerated. Like the operation for strangulated hernia, tracheotomy, to be successful, must be performed before the changes in the part are likely to render it useless.

§ 5.—STATISTICS OF THE OPERATION OF TRACHEOTOMY.

In order to show the data upon which the opinion just expressed has been based, I have collected from various sources the results of the operation, as performed for the relief of croup, as well as for other purposes, and present them in the tabular form, as being that which most readily exhibits the result.

I. TRACHEOTOMY FOR CROUP.

The following table shows the success obtained from the operation of Tracheotomy, as usually performed for the relief of membranous croup, the wound being mostly kept open by means of a canula in the windpipe. This table contains all such cases as were reported so as to be accessible to me up to Jan. 1854, and may be relied on, in the formation of an opinion, as far as any mere enumeration of the result of any operation can be, unless more details of the cases were furnished than is compatible with the limits of this volume, as the Bibliographical Index presents a full reference to such of the cases in the following table as were reported by American surgeons. Those desirous of further details, will find them in the journals there quoted.

OPERATOR.	OPERATIONS.	CURED.	DIED.
Amussat	6	0	6 ¹
Baudelocque	15	0	15 ¹
Blandin	5	0	5 ¹
Bretonneau	18	4	14 ¹
Gerdy	6	4	2 ¹
Guersent	9	0	9 ¹
Guersent, Hôpital des Enfants,			
Malades in 1850 had	20	7	13 ⁴
“ in 1851 had	30	13	17 ⁴
“ in 1852 had	59	16	33 ⁴
This success was owing to greater attention to the treatment of the wound.			
Maslieurat	2	1	1 ¹
Petit	6	3	3 ¹
Roux	4	0	4 ¹
Velpeau	6	0	6 ¹
Trousseau	153	41	112 ²
Pancoast	9	4	5 ³
Page	1	0	1 ⁵
Smith	1	0	1 ⁵
Thompson	1	0	1 ⁵
E. Atlee	1	0	1 ⁵
Townsend	1	0	1 ⁵
Van Buren	1	0	1 ⁵
Buck, Jr.	2	2	0 ⁵
Johnson	1	0	1 ⁵
Goddard	1	0	1 ⁵
Burgess	2	1	1 ⁵
McIlvain	1	0	1 ⁵
Carter Johnson	1	0	1 ⁵
Pitney	1	1	0 ⁵
Ayres	1	1	0 ⁵
Bigelow	1	0	1 ⁵
	<hr/> 365	<hr/> 98	<hr/> 257

From this it is seen, that of 365 cases of tracheotomy performed for the relief of croup, in which the operation was not resorted to until nearly every other means had been tried, only 98 were cured, whilst 257 died, that is, in the 365 cases operated on, only seven more than one-fourth of the patients recovered.

¹ Condie on Children, edit. 1844, p. 310.

² Lond. Med. Examiner, Aug, 1851, p. 134, from Gazette des Hôpitaux. Transylvan Med. Journ., vol. ii. p. 325.

³ J. Pancoast, in MS. Jan. 29, 1852.

⁴ Transylv. Med. Journ., vol. ii. p. 325.

⁵ See Bibliography, p. 84, *et supra*.

The next table shows a very different result, the same operation being performed at a period when the trachea was not diseased.

II. TRACHEOTOMY FOR THE REMOVAL OF FOREIGN BODIES, &C.

This table contains cases collected by myself, and reported up to Jan. 1854.¹

	CURED.	DIED.	SUBSTANCE.
John Newman, N. C. . . . 1			Bullet.
Amassa Trowbridge, N. Y. . 1			Bean.
H. G. Jameson, Md. . . . 1			Watermelon seed.
" " " . . . 1			Pebble.
Samuel Cartwright, Miss. . 1			Watermelon seed.
H. T. Waterhouse, N. Y. . . 1			Watermelon seed.
Joseph Palmer 1			Bean.
Richard Burgess 1			
Peter P. Woodbury, N. H. . 1			Bean.
Calvin Jewett, Vt. . . . 1			Bean.
" " " 1			Iron nail near two inches long.
Enos Barnes, N. Y. . . . 1			
Abner Hopton, N. C. . . . 1			Grain of corn.
Zadok Howe, Mass. . . . 1			Bean.
J. F. Hardy, N. C. . . . 1			Watermelon seed.
Charles Hall, Vt. . . . 1			Pipe stem.
J. Mason Warren, Mass. . . 1		3	Bean, pin, carpet-tack, nail.
Twitchell, N. H. 2			Bean.
William Davidson, Ind. . . 1			Grain of corn.
W. H. Van Buren, N. Y. . . 1			Plum stem and watermelon seed.
J. H. Kearny Rodgers, N. Y. 1			Cherry stone.
Evans, Ky. 1			Vapor of hot water.
N. R. Smith, Md. 1			(Laryngotomy.) Cockle bur.
Liston 1			Glass seal.
Pancoast, Philad. 3		1	Result not stated.
Brainard 1			Abscess root of tongue.
Gilbert 3			Coffee-grain, raw potato, corn.
Morehouse 1			Almond shell.
May 2			Coffee and corn grains.
Neill 1			Epilepsy.
Hoyt 1			Bean.
Trabue 1			Corn grain.
W. H. Massey 1			Soup bone (chip).
	Cured	Died	Total
	38	5	43

¹ See Bibliography, pp. 84 to 89.

From this it appears that, in 43 cases of tracheotomy performed for the removal of foreign substances from the trachea, 38 were cured, and only 5 died—the trachea being allowed to close and heal as soon as possible after the operation.

In comparing the results of these two tables, it is very evident that the dangers which ensue upon incising a healthy trachea are comparatively slight, and that the great mortality which has attended the operation, when performed for the relief of croup, must be due to some other cause than the mere incision of the windpipe. But whether this cause is to be found in the changes produced by the disease, or whether it is the result of an incision in an inflamed instead of a healthy structure—or whether it is not owing to the delay usually attending the performance of the operation, is a point which can only be settled by each operator hereafter specifying the peculiarities of his cases.

CHAPTER IV.

OPERATIONS UPON THE PHARYNX AND ŒSOPHAGUS.

THE Œsophagus, or musculo-membranous canal, which extends from the mouth to the stomach, is liable to various affections, the relief of which often demands more or less interference on the part of the surgeon. Among the more important of these complaints, may be mentioned those resulting from the passage of foreign substances, of a hard and irritating nature, which being inadvertently introduced into the mouth, are thence carried down the œsophagus towards the stomach, and liable to be arrested at various points; as well as the disorders consequent on inflammation in or around the proper structure of the canal itself. From the importance of this tube, and the difficulties of reaching it from the outside of the neck, its relations to surrounding parts should be thoroughly studied by the surgeon before attempting any of the cutting operations sometimes required for its relief.

SECTION I.

SURGICAL ANATOMY OF THE PHARYNX AND ŒSOPHAGUS.

Although, to an ordinary observer, the Œsophagus is one continuous canal, which reaches from the mouth to the stomach, anatomists have usually divided it into the pharynx, or that funnel-shaped cavity, which extends from the base of the cranium to the lower part of the cricoid cartilage, between the cervical vertebræ and the posterior part of the nose and mouth, and into the Œsophagus proper, or the tube which extends from the same cartilage, or lower part of the fifth cervical vertebra, to the cardiac orifice of the stomach.

§ 1.—OF THE PHARYNX.

The Pharynx is composed of two coats, a mucous one, which is continuous with the same membrane in the mouth, and a muscular coat, composed of three constrictor muscles, placed one above the other, the contractions of which convey the food from the mouth into the Œsophagus. In the mucous membrane of the pharynx may be noticed a large number of muciparous follicles, which occasionally enlarge and create irritation or inflammation about this region. Beneath or behind the mucous membrane is a sparse layer of cellular tissue, in which are found the bloodvessels and nerves of the part, the arteries being branches of the carotid; the veins emptying directly into the internal jugular, and the nerves being branches of the glosso-pharyngeal, pneumogastric, and fifth pair.

The muscles of the pharynx mainly arise from the surrounding bony prominences on each side, and, being joined to their fellows, are enabled to diminish the transverse diameter of the opening, and force the bolus of food or other substance downwards, till it reaches the proper portion of the Œsophagus.

§ 2.—OF THE ŒSOPHAGUS.

The Œsophagus extends from the inferior extremity of the pharynx to the stomach, is from ten to twelve lines in diameter, about

ten inches in length, and, when quiescent, flattened from before backwards. In its descent to the stomach, this canal is between the great vessels of the neck, directly upon the muscles in front of the vertebræ, but inclined towards the left side of the middle line. At the lower part of the neck it is yet more to the left side of the trachea than behind it, and is united to adjacent parts by a loose cellular tissue.

The Œsophagus presents three coats, which are designated as the muscular, cellular, and mucous.

The Muscular coat has its fibres arranged circularly, internally; and longitudinally, externally. The Cellular coat is well developed, adhering more closely to the mucous membrane than to the muscular fibres, presents a filamentous character, and contains numerous lymphatic glands.

The Mucous coat, in the undistended condition, presents itself chiefly in longitudinal folds, thus favoring the passage of substances to the stomach; and is covered by a delicate epidermis, which, under certain circumstances, becomes thickened and very distinct.

SECTION II.

OPERATIONS UPON THE PHARYNX.

Among the diseases of the pharynx requiring surgical treatment, are the formation of polypi, as has been already referred to in connection with the nose; inflammation of the upper portion resulting in stoppage of the Eustachian tubes, as mentioned in the diseases of the ear; and the formation of abscesses, the treatment of which is to be accomplished by a simple puncture of the swelling at its most prominent point, as is hereafter shown.

The other disorders, demanding surgical interference, are a hypertrophied condition of the muciparous follicles, and the removal of foreign bodies arrested by its walls.

§ 1.—HYPERTROPHY OF THE FOLLICLES OF THE PHARYNX.

Hypertrophy, or an enlarged condition of the follicles of the mucous membrane of the pharynx, is an affection which has lately

received a degree of attention that it does not deserve, and were it not that the accounts given of it are liable to lead the inexperienced to regard it in too serious a light, this disorder might justly be passed by without notice. In many instances, and especially in those who smoke tobacco freely, it will be found that these enlarged follicles have existed a long time without attention being directly called to them, until they have been knowingly spied out as the seat of symptoms with which they are by no means certainly connected. But when, after a skilful investigation of the case, the surgeon believes that they really cause the patient any inconvenience, he may do much towards removing it, simply by stimulating the surface of the membrane by the application of the nitrate of silver, dilute nitric acid, strong tincture of iodine, sulphate of copper, or some similar substance, applied either with a camel-hair pencil, sponge, or swab.

§ 2.—TUMORS IN THE PHARYNX.

The Pharynx being lined with a mucous membrane, and attached to the fibrous structure (periosteum and ligaments) which covers the front of the cervical vertebræ, as well as the basilar process and sphenoid bone, is occasionally the seat of tumors, either of a polypoid or fibrous character, which, encroaching upon this region, interfere so much with deglutition, respiration, and speech, as to require their removal. When they attain any size, their removal will nearly always necessitate the division of the soft palate, or even the cheeks, in order to expose them with sufficient freedom to permit their extirpation; but when they are of smaller size, they may be strangulated, by means of the ligature and canula, passed either through the mouth or nostril, the latter being preferable. The following operation, as performed by Dr. L. A. Dugas, of Georgia, fully illustrates the proceeding which may be demanded under similar circumstances.

OPERATION OF DR. DUGAS.—A man laboring under a tumor of the size of a large egg, which filled the pharynx, and extended downwards as far as the larynx, and laterally from one tonsil to the other, forcing down the right one, whilst it carried the soft palate downwards, so as to constitute a prominence of the size just stated, causing difficult deglutition, &c., was operated on in the following manner: A ligature being passed beneath the right carotid artery,

and left there to be tied when necessary, the patient was seated in a chair, and an incision made through the cheek from the right angle of the mouth to the masseter muscle, the divided facial artery being tied in the wound. A longitudinal incision being then made in the soft palate from the side of the uvula to the roof of the mouth, the palate was detached from the tumor, in the form of flaps, exposing a bright glistening tumor which was adherent posteriorly and laterally to the adjacent parts by strong cellular tissue. The access to the parts being now free, the cutting instruments were laid aside whilst the mass was seized with strong tumor forceps, and drawn forwards, the attachments of the lower portion of the tumor being torn asunder by the fingers. The left, upper, and part of the right portion of the mass being then torn in like manner by the fingers, this part of the tumor was removed, when another similar structure was seen on the right side, in intimate connection with the right tonsil, which it had passed downwards, being covered by a thin stratum of muscular fibres, which were derived from the pharyngeal muscles. On dividing this stratum with the knife, and pressing it aside, this portion of the tumor was also removed with the forceps and fingers, though not without great difficulty, as it was found to be attached to the ramus of the lower jaw, near the sigmoid notch, to the pterygoid process of the sphenoid bone, and to the posterior aperture of the right nostril. The hemorrhage was smaller than might have been anticipated, but required to be checked occasionally by cold water, thrown into the pharynx with a syringe, after which the cheek was united by sutures and adhesive straps, the ligature around the carotid artery being allowed to remain until next morning as a precautionary measure. This patient soon recovered, and the microscope showed that the tumors were purely fibrous, and without any evidence of a malignant disorder.

§ 3.—FOREIGN BODIES IN THE PHARYNX.

From the efforts made in swallowing, it occasionally happens that foreign substances of various kinds, but especially those which are sharp and fine, are arrested in the pharynx, and retained there in such a manner as enables them to be reached with the finger or forceps. Generally, the most serious part of their removal is found

in the difficulty of recognizing their position. When the foreign body is small and sharp-pointed, like a pin, needle, or fish-bone, it may be looked for about the posterior half arches, or near the tonsils; as these articles, from their small size and pointed character, are more apt to lodge in the line of the superior constrictor muscle of the pharynx than those which are larger, and which, being more readily seized by the muscles, are carried further into the œsophagus. Thus, in eating fish, the softer portion of the bolus may pass, but the constriction of the mass forcing the point of a bone into the upper part of the pharynx, it will nearly always be seen presenting itself transversely to the pharynx, or be found about the points just designated. The same is true of pins or needles, of which one escaping from the mouth, suddenly induces an effort to swallow, in which effort the pharynx, being contracted laterally, the point pricks the walls of one side, induces further spasmodic effort, until, at last, the pin is found to have been buried by its point in the mucous coat, or, perhaps, a little deeper. When foreign substances penetrate deeply through the pharynx, there is, in addition to the inconvenience caused by their position, also some risk of their inducing such inflammation of the tissues as may result in an abscess, or they may cut their way into the larynx,¹ or injure the arteries of the neck; for these reasons, they should be promptly removed, if possible.

OPERATION.—Place the patient in a strong light, depress the tongue with the forefinger of the left hand, and look for the foreign body, or, if it cannot be seen, pass the same forefinger into the throat, and feel for it. Then, using the finger as a guide, pass a pair of suitable forceps along it, and endeavor to seize the substance so as to extract it lengthwise and not transversely, lest its escape be resisted by the contraction of the half arches consequent on the gagging which the presence of the instrument will induce.

§ 4.—RETRO-PHARYNGEAL ABSCESS.

The formation of an abscess in the tissues situated between the posterior wall of the pharynx and the fronts of the bodies of the cervical vertebræ is an affection which, from its frequent fatal result, by extension of inflammatory action to the glottis, and its

¹ See Bibliography, article *Œsophagus*, p. 84.

effects upon the trachea, should be promptly treated. Although long noticed by surgical writers, the dangers of this affection and the necessity of prompt treatment have not been generally insisted on. In a recent paper published¹ by Dr. Charles M. Allin, of New York, the fatal character of the complaint is justly noted, as well as the liability of the surgeon to overlook its existence. Of the fifty-eight cases referred to by Dr. Allin, only twenty-eight were relieved or cured, or about one-half died. Owing to the distance of the abscess from the mouth, and the liability of the matter to escape suddenly into the larynx, various means have been advised for its evacuation, as the trocar and canula, &c. A simple and safe method will be found in the plan pursued by Dr. Allin.

OPERATION.—The patient's head being firmly supported by an assistant, pass the forefinger of the left hand into the mouth, depress the tongue, raise the velum palati, and press the point of the finger against the tumor. Then pass a sharp-pointed bistoury, the blade of which is covered with adhesive plaster, to within half an inch of its point, along the left forefinger as a director, and make a free incision through the walls of the pharynx, on the median line of the throat, so as to open the cavity of the abscess. By this free incision, fistulous tracks will be avoided, and simple detergent washes will complete the cure.

SECTION III.

OPERATIONS UPON THE ŒSOPHAGUS.

The Œsophagus being the principal channel by which substances enter the system, is liable to various complaints in consequence of the improper character of the articles introduced into the mouth. Particles of food taken at a high temperature, or imperfectly masticated; or foreign bodies intended to be held temporarily in the mouth, but which are suddenly swallowed; or a diminution of the caliber of the passage, owing to various causes, are all instances of the evils to which a patient may be exposed in the daily use of this part. Two specifications will, however, embrace all the operations required by this structure, independent of wounds, to which it is

¹ New York Journ. Med., vol. vii. p. 325.

liable in connection with other parts of the neck, to wit, the removal of foreign substances from it, or from the stomach, and the restoration of its natural caliber, in cases of stricture.

§ 1.—REMOVAL OF FOREIGN SUBSTANCES FROM THE ŒSOPHAGUS AND STOMACH.

In order to estimate correctly the principles especially applicable to the removal of foreign substances from the œsophagus, some attention should be given to the anatomical relations of this part, as well as to its functions.

In a well-written paper upon this subject, by Dr. Henry Bond, of Philadelphia,¹ may be found some sound views of the physiological action of the part, as well as of the means required for the extraction of foreign bodies from the canal; and from this paper many of the following facts have been extracted.

I. EFFECTS OF THE INTRODUCTION OF A FOREIGN BODY INTO THE ŒSOPHAGUS.

The general anatomical relations of this canal having been already stated, it is sufficient, at present, to mention that the posterior surface of the trachea and larynx, as far as they are in connection with the œsophagus, present to it a yielding ligamentous structure capable of being impinged upon by any substance which may be arrested in the latter. As the anterior wall of the œsophagus is that which is chiefly expanded in the effort of swallowing, the foreign article is generally brought more immediately in contact with the back of the larynx and trachea, at those points where there is merely a ligamentous structure, where, by exciting the muscles of the glottis, it causes irritation and efforts to cough, which occasionally become spasmodic. If, then, an article should remain in the œsophagus, at a point sufficiently high to enable it to impinge upon this portion of the trachea, coughing or threatening of suffocation must ensue. Cause it to pass either above or below the larynx and trachea, and the most annoying symptoms will disappear. Two plans of treatment in these cases have, therefore, been resorted to, the selection

¹ North Amer. Med. and Surg. Journ., vol. vi. p. 278.

of either being guided by the judgment of the surgeon at the moment, to wit, either to carry or force the substance into the stomach, which answers very well when the article is an innocuous one, or, when it is not, to remove it by some suitable means, such as the efforts of the patient when excited by vomiting or by manual interference on the part of the surgeon. For the accomplishment of the latter, various means have been suggested, as forceps, hooks, and sponges. But, without entering into the details of these inventions, it may be sufficient merely to direct attention to such as will be found in Plate XXX., among which can be seen the admirably adapted forceps of Dr. Bond, and a hook, brought to the notice of the profession in the United States by the late Dr. Nathan Smith, of New Haven.¹ An instrument, very similar to this, is also represented as copied from the European plates, the invention of which is assigned to Dupuytren; but, as no date is given to it, I have found it difficult to establish the priority of either, the difference in the character of the two being very slight. Dupuytren has claimed the hook as his; but whether he followed Dr. Smith, or preceded him, the latter states explicitly that "his hook is unlike anything which he has known to be employed for a similar purpose;" and he, therefore, furnishes a drawing of it in the paper referred to,² deeming it especially suited to the removal of coins. Both hooks, though adapted to a certain class of foreign bodies, are not applicable to all, and, as compared with the gullet-forceps, are thought to be inferior to the instrument of Dr. Bond. The latter is capable of taking hold firmly, and extracting safely any foreign substance, no matter how fine or small, which is within the length of the instrument, that is, two or three inches below the top of the sternum, measuring from the mouth, and yet not liable to pinch the internal coat of the canal, whilst the hooks are only adapted to larger objects.

OPERATION WITH THE FORCEPS OF DR. BOND.—Place the patient in a strong light, with the head thrown back, if the foreign substance is small, but if large, with the chin approximated to the sternum, so as to relax the sterno-hyoid and thyroid muscles, lest, by compressing the trachea against the bodies of the vertebræ, the foreign article be caused to impinge on the larynx, and such a spell of coughing induced as will materially interfere with the operation.

¹ New York Med. and Phys. Journ., vol. iv. p. 576, 1825.

² See Plate XXX., Fig. 4.

PLATE XXXII.

OPERATIONS PRACTISED ON THE ŒSOPHAGUS AND LARYNX.

Fig. 1. A front view of the application of the Œsophageal Hook of Dupuytren, as represented upon the subject, by a section of the mouth. 1. A longitudinal section showing the left half of the tongue. 2. A vertical section of the lower jaw. 3. Top of the epiglottis cartilage as applied over the glottis in the effort of swallowing. 4. The upper end of the Œsophageal Hook. 5. Its lower extremity with the basket attached to it. 6, 6. Dotted lines showing the course of the Œsophagus.

After Bourguery and Jacob.

Fig. 2. A front view of a section of the Mouth and Throat, showing the application of the sponge to the Larynx, as advised by Trousseau and Green. 1. Longitudinal section of the tongue. 2. Inferior maxilla. 3. Os hyoides. 4. Section of the epiglottis cartilage. 5, 5. Sections of the thyroid cartilage. 6. Point to which the sponge may be introduced. 7. Upper end of the instrument. 8. Its lower end with the sponge in position.

After Bourguery and Jacob.

Fig. 3. A view of the relative position of the Surgeon and Patient in the operation of washing out the stomach by means of the Stomach Pump and Œsophageal Catheter, as suggested by Dr. Physick, of Philadelphia. The patient is represented as reclining with the head thrown back, and the jaws distended by a plug of wood introduced between the molar teeth. The Œsophageal Catheter of Physick has been introduced into the stomach, and then attached to the nozzle of the pump which is placed in a basin close alongside of the patient. The surgeon is represented in the act of drawing the liquid into the pump from the bowl. 1. Physick's Œsophageal Catheter. 2. The Stomach Pump of Dr. Goddard.

After Nature.

Fig. 1



Fig. 2



Fig. 3



Then, placing a plug between the molar teeth, depress the tongue with the forefinger of the left hand, and pass the forceps into the œsophagus with the right hand, when the substance, if high enough to be seen, may be readily extracted. But if lower down, the tongue should be depressed by an assistant by means of the instrument (Plate XXX., Fig. 11), whilst the surgeon, opening and shutting the blades of the forceps, should carry the handles from left to right, or the reverse, so as to sweep the œsophagus with the points of the instrument. Should it be a coin, or a similar article, the dilatation of the walls of the œsophagus will render the passage of the blades on each side easy; but if it is a smaller body, as a pin or fish-bone, the operator need not fear an injury to the walls of the canal, as the instrument is so constructed as to render such an event almost impossible.

Dr. Constantine Weever, of Michigan, has also published¹ the description of a pair of forceps, consisting of a two-bladed whale-bone stylet, which being inserted in a flexible catheter, is passed down to the substance pushed out of the catheter so as to expand on each side of the article to be removed, and then made to seize it by pressing the catheter upon its blades. This instrument, which acts on a principle similar to that of the litholabe of Civiale, may prove useful where the foreign substance is very far down, and yet of such a nature as should forbid its being pushed into the stomach by a probang. If the article to be removed is barbed and sharp-pointed, like a fish-hook and line, no expedient will probably answer better than that suggested, under similar circumstances, by Dr. Brite, of Kentucky,² to wit, the slipping of a sufficiently large and perforated bullet over the line and point of the hook, by directing the patient to swallow the bullet.

When the dangers that may result from the perforation of the aorta or trachea,³ as the result of the continued presence of irritating articles in the œsophagus is recollected, it may be well for the surgeon to be as unceasing as is prudent in his efforts to carry the article either upwards or downwards.

Where the foreign body is so placed in the œsophagus that its position can be distinguished by the touch externally, the propriety

¹ Amer. Journ. Med. Sciences, vol. xiv. p. 111, 1834.

² See Bibliography, article Œsophagus, p. 83.

³ See Bibliography, p. 84.

of performing œsophagotomy is a question worthy of consideration. Many substances of a durable nature have, however, been known to remain for years in the œsophagus without creating intolerable inconvenience, one of which is reported by the late Dr. Dorsey, of Philadelphia,¹ and the possibility of such a condition should always, therefore, be recollected. In this case, a copper coin remained thirteen years in this tube without destroying life. On the other hand, very small substances, especially when presenting sharp edges, have ulcerated through into the trachea, or penetrated the vessels or injured the important nerves about this region, though they have also occasionally created abscesses, and thus been discharged externally.

§ 2.—EXTRACTION OF NOXIOUS SUBSTANCES FROM THE STOMACH,
THROUGH THE ŒSOPHAGUS.

The introduction of the Œsophageal Catheter, and the extraction of any substance capable of passing through its channel, is so simple an operation as to require but a few words.

OPERATION.—After placing a plug between the back teeth, so as to protect the fingers, or the tube, from being bitten by the patient, pass the forefinger of the left hand to the root of the tongue, and gently depress this organ. Then pass the catheter rapidly backwards till it reaches the back of the pharynx, when, if the resistance that it meets with is not sufficient to depress its point, turn it down by the forefinger previously introduced. By carrying the point of the catheter towards either half arch, there will be little risk of introducing it into the larynx, as the latter will be closed in consequence of the gagging induced by the presence of the finger in the pharynx. The introduction of the liquid, when it is necessary, to wash out the stomach, may then be effected by the stomach-pump (Plate XXX. Fig. 1),² or by a large rectum syringe. In withdrawing the catheter, its free end should always be closed by the finger, in order to prevent the escape of any drops of liquid into the trachea.

REMARKS.—The performance of the operation of introducing the stomach-tube is so simple an affair that the evacuation of the con-

¹ Bibliographical Index, p. 83.

² See Bibliography, p. 84.

tents of the stomach has more than once been done by a good hospital nurse. Within about fifty years, the extraction of poisons from the stomach, except by emesis, was, however, an operation quite unknown, until Dr. Physick, of Philadelphia, employed the now well-known stomach-tube, or œsophageal catheter, the benefits resulting from which have been so great, that the profession in the United States may well be jealous of the credit of the invention and application of such a simple contrivance. In support of this assertion, I would mention the following facts: In the *American Medical Recorder*,¹ Dr. Caleb B. Matthews published a paper, in which he showed very satisfactorily the origin of this instrument, Dr. Philip Syng Physick, in 1800, having recommended it in his annual lectures in the University of Pennsylvania. Dr. Dorsey, who was in Paris in 1803, also states that he had a gum-elastic tube, or catheter, made to Dr. Physick's order, for the purpose of evacuating the contents of the stomach, the length of which was so great as to excite considerable curiosity among the Parisian manufacturers of catheters, who could not divine for what purpose it was intended. In 1809 this instrument was employed by Dr. Dorsey,² and by others subsequently, an indefinite number of times. From a claim afterwards made for the priority of this invention by Dr. Alexander Monroe, Jr., of Edinburgh, it seems that this gentleman had also conceived the same idea, and in an inaugural thesis, published in 1797, proposed similar means for extracting poisons, though he does not appear to have ever brought his suggestions into practice. Dr. Physick, though admitting at a later period the coincidence of this suggestion, always stated his ignorance of the thesis in which it was published; and being the first person who had one constructed and employed, is certainly entitled to the credit of the operation, though willing to share the originality of the suggestion with another.

In the paper advocating the claims of Dr. Physick, will also be found a reference to the apparatus of Dr. Ewell, of Washington, as proposed in 1808, and of Mr. Jukes, of London, who contrived similar means in 1822, as well as the testimonials of the distinguished practitioners of that period, who by common consent seem to have awarded the merit of the original manufacture and application of the tube to Dr. Physick, he having, in the paper referred to, also furnished drawings of the stomach-pump, to which it was adapted.

¹ Am. Med. Record, vol. x. p. 322. Philad. 1826.

² Eclect. Repertory, October, 1812.

§ 3.—STRICTURE OF THE ŒSOPHAGUS.

PATHOLOGY.—The analogy existing between strictures of the œsophagus and those of the urethra, has always attracted the attention of surgeons when referring to this complaint. From the difference, however, which exists between the surrounding tissues in these two structures, a special description of the effects of the complaint, as developed in the œsophagus, is essential to a correct appreciation of the value of the various modes of treatment proposed for its relief.

In an able article, written by Velpeau,¹ will be found much valuable information, and to it I am mainly indebted for the following details:—

The condition of the œsophagus, under the various causes producing stricture, is very varied; but, however excited, the constriction will generally be found to exist either near the upper or lower extremity of the tube, and to be due to certain deposits around, or changes in the mucous coat of the canal. Sometimes this coat is simply thickened, though it has also been found to be decidedly hypertrophied. When the stricture has existed for some time, or has commenced in the cellular coat of the œsophagus, the induration of the part is so marked as to present a mass closely analogous to scirrhus, whilst it has occasionally been found to have changed or entirely destroyed the ordinary characters of both the mucous and muscular coats, thereby rendering it difficult to decide in which tissue the disease had commenced.

The extent of a stricture in the œsophagus is very variable, usually it is not more than a few lines, though it may reach to the length of several inches. At the seat of stricture there is often found a central contraction, or bandlike thickening, above and below which the indurated part is less constricted, whilst the portion of the canal immediately around the seat of the stricture, has been known to be dilated into a pouch capable of holding a quart of liquid. Below the stricture, the œsophagus is occasionally more contracted than natural, and its parietes are also found to be thicker than in the normal condition. Frequently, on the contrary, it has presented no marked alteration. Ulcerations have also been found in the strictured portion of the canal, though they are believed to be more

¹ Dictionnaire des Sciences Médicales, tome 21^{me}, p. 397. Paris, 1840.

common above it, either in consequence of the particles of various substances remaining in the dilated portion, or from the efforts of the muscular coat of the canal to eject them, inducing increased inflammatory action.

In many instances, the adjacent lymphatic glands are either engorged or degenerated; and when the stricture has been seated in the neighborhood of the thyroid gland, the latter has been seen to be either hypertrophied, or very materially changed in its structure. In some instances, adhesions have formed between the posterior face of the trachea and the front of the Œsophagus, or between the latter and the carotid artery or the aorta, under which circumstances, a perforation of the Œsophagus at these points is inevitably fatal.

From this statement of the changes in the structure of the part, every surgeon must see the dangers attending any attempt to overcome old strictures of the Œsophagus; and he should, therefore, be especially cautious, not only in his prognosis, but also in the employment of the various means that have been suggested for the relief of the complaint.

The operations that have been recommended for the cure of Œsophageal contraction consist in dilatation of the stricture, in the absorption or destruction of the diseased substance, or in a direct incision through the constricted portion, so as to destroy the permeability of the canal.

I. DILATATION OF THE STRICTURE.

INSTRUMENTS.—Without entering upon an account of the various instruments that have been suggested for the purpose of dilating the stricture, this account will be limited to the operation as accomplished by means of bougies. As originally suggested by Sir Everard Home, these bougies were made of waxed linen in the manner that will be referred to under the head of operations on the urethra, and being passed into the Œsophagus, by the manœuvre directed for the introduction of the stomach-tube,¹ were either held for a few minutes against the seat of the disease, or gently pressed through the stricture, so as to dilate the canal as they advanced. The ordinary condition of these bougies, when made entirely of

¹ See p. 486.

linen, does not, however, afford sufficient firmness to prevent the pressure upon them causing a lateral deviation of the instrument, in consequence of which the surgeon cannot tell accurately upon what point of the œsophagus his force is applied. An instrument which I have found to answer better, is one that was employed by the late Dr. Wm. E. Horner, of Philadelphia, and represented in Plate XXX., Fig. 6. It is formed by rolling a piece of waxed linen, about three inches long, and cut bias, so as to give it a conical shape, around the end of a flexible piece of whalebone, like that employed for the probang.

OPERATION.—After smearing the instrument either with molasses or oil, pass it into the seat of the stricture, and make gentle pressure at the obstruction until it yields, directing the point of the bougie to the part that seems most constricted.

REMARKS.—In all attempts at dilating strictures of the œsophagus, it should be remembered that gentle and continued pressure answers better than violent efforts. In fact, the principles that would direct the dilatation of a strictured urethra, are also those which should guide the operator in relieving the similar condition of parts in the œsophagus. But very little force should therefore be employed in dilating œsophageal strictures, as the œsophagus about the seat of the stricture is very liable to dilatation, as well as to softening or ulceration; if then the bougie is made to bear too forcibly on such a point, perforation of the canal might ensue, and the patient be exposed to all the risks of suffocation or infiltration of the surrounding parts on the first attempt that is made to swallow liquids. In the lighter forms of permanent stricture, in which the tissues are not much changed, and in the spasmodic variety, dilatation presents many chances of success; but, dilatation of strictures in the œsophagus, like those in the urethra, will prove but a temporary means of relief if the surrounding parts are much indurated. Under these circumstances, the application of caustic may be advantageous, if judiciously and carefully directed.

II. APPLICATION OF CAUSTIC.

The caustic applied for the relief of strictures of the œsophagus, may be either the Kali purum or caustic potash, or the nitrate of silver. From the difficulty of regulating the action of the potash,

and the peculiar advantages resulting from the application of the lunar caustic to the mucous membranes generally, the latter is decidedly preferable. It may be employed in the following manner:—

OPERATION.—Pass a simple or unarmed bougie down to the stricture, and mark accurately the distance of the disease from the mouth. Then arm another bougie, by scooping a little hole in the end of the waxed linen, and fitting in this a small piece of the nitrate of silver: be careful to fasten it accurately in its place, so that it may project a little beyond the level of the point of the instrument. Mark upon this bougie the distance of the stricture from the teeth, as shown upon the former instrument, and passing it rapidly to the seat of the disease, retain it in contact with the part from one to three minutes. On withdrawing it examine the caustic, in order to judge how much has been dissolved, and if it is deemed to be too much, or such as might act upon the surrounding parts, cause the patient to swallow some strong salt and water in order to neutralize it and prevent its continued action.

REMARKS.—The application of the nitrate of silver in this disease is beneficial in two ways: 1st, by repeatedly creating a superficial eschar on the surface of the stricture, it gradually destroys it; and 2d, by allaying the irritability of the canal, or by stimulating the absorbents, and modifying the action of the mucous membrane, it does much towards the radical cure of the complaint. After a few applications of it, the simple bougie will often be found to pass readily, whilst the relief will be more permanent than that which ensues upon the simple dilatation of the part, except in the spasmodic form of the complaint. It need hardly be said that the application of the caustic should be restricted to the diseased portion of the canal, by placing it in such a position in the bougie as will prevent its action elsewhere.

III. ŒSOPHAGOTOMY.

Under peculiar circumstances, as when it is necessary to remove a foreign body from the canal; or when, in cases of impervious stricture, there is a necessity for the introduction of food in order to sustain life, it has been advised to incise the œsophagus from the outside of the neck. Although a rare operation, and one which

offers but slight chances of permanent relief in cases of stricture, this operation has been successfully resorted to, an example of which has been reported by Taranget,¹ where the patient was thus nourished sixteen months.

Nearly equal success has, however, been obtained by a direct opening into the intestines or stomach, while the injection of nutritive substances into the rectum presents a very good substitute for such hazardous means of treatment.²

In a paper by Dr. John Watson, of New York, may be found the history of a case in which the patient's life was considerably prolonged by this operation, though he ultimately died from the extension of the disease to the bronchia. Œsophagotomy is, however, very rarely resorted to, having only been performed five times, two of which were reported more than a century since.

Three modes of operating have been suggested, to wit, that of Guattani, who incised the left side of the neck, and dissected to the œsophagus, between the trachea and the sterno-hyoid and thyroid muscles (Plate XXXVI., Fig. 6); that of Eikholdt, who made his incision between the two origins of the sterno-cleido-mastoid muscle; and that of Boyer, who cut between the sterno-hyoid and sterno-mastoid muscles. Boyer only opened the œsophagus for the extraction of foreign bodies, and was, therefore, guided by the projection of the substance. Giraud and Vacca Bellingheri first introduced a silver sound, so as to render the œsophagus prominent; and Begin trusted entirely to the anatomical relations of the part.³

Without further reference to these various plans of treatment, it may suffice, as illustrative of a successful method of operating, to state the manner in which it was accomplished by Dr. Watson, in February, 1844.

OPERATION OF DR. WATSON, OF NEW YORK.—The patient being placed on a cot near a window, with his back well supported by pillows, and his head thrown gently backwards, the incision was commenced on the left side of the neck, midway between the os-hyoides and the upper border of the thyroid cartilage, just in front of the sterno-mastoid muscle, and carried down parallel with the edge of this muscle to within an inch of the sterno-clavicular arti-

¹ Dict. des Science Méd., tome xxi. p. 412.

² Bibliography, p. 84, art. Œsophagus, paper by Dr. D. J. Cain, of Charleston.

³ Malgaigne, Philadelphia edit., p. 376.

culation, dividing the skin, superficial fascia, and platysma-myodes muscle.

A second incision, nearly an inch in length, was now made nearly parallel with the upper edge of the thyroid cartilage, terminating posteriorly at the upper extremity of the first and extending to the same depth. After turning up the flap at the angle of these cuts, a glandular tumor, about the size of a hazel-nut, was exposed and removed from among the layers of the deep fascia. It proved to be very hard, and contained a yellowish concrete pus in the centre. The dissection being then continued through the deep fascia, the omohyoid muscle was exposed and divided; the superior thyroid artery brought into view, secured by two ligatures, and divided between them and the loose cellular tissue between the carotid and the trachea, separated by the handle of the scalpel until the lower portion of the pharynx and part of the Œsophagus were fairly exposed, this structure being put upon the stretch at every effort of the patient to swallow. The edges of the wound being then dilated by curved spatulæ, an attempt was made to seize and puncture the wall of the pharynx; but owing to the difficulty of accomplishing it without endangering other parts, a silver catheter was introduced through the mouth to the stricture, and, its point being cut upon, the Œsophagus was opened.

On passing an instrument into the opening, the seat of obstruction was found to be just below the incision but within reach of the finger; and, as there was danger of wounding the ascending thyroid artery, in an attempt to divide it from within, it was found necessary to open it from without. In order to obtain room, the sterno-mastoid muscle was therefore divided transversely, and the upper border of the thyroid gland turned down.

The recurrent nerve being now brought into view, one of the branches of the superior thyroid artery was divided as it entered the gland, giving rise to the only hemorrhage that required attention during the operation, and this being arrested, the division of the stricture was effected by an incision through it of at least an inch and a half in length, the obstruction depending apparently on a simple induration and contraction of the part not over five or six lines wide. A stomach-tube being now introduced through the wound, wine and arrowroot were administered. This tube was then secured to the side of the head by its free extremity, the transverse portion of the wound closed by a single suture, and the

remainder allowed to remain open. At the end of six days, the tube being removed, a second one was introduced through the nostril, down through the stricture, and worn twenty-five days, the wound being closed by adhesive plaster. Several changes in the catheters being made from time to time, the patient continued wearing them for nearly seven weeks, the wound having healed around it. At the end of this period, the tube was withdrawn on account of the irritation in the throat, the obstruction in the œsophagus reappeared, so as to require the reopening of the wound in the neck, and the patient died about three months subsequently.

REMARKS.—That Œsophagotomy is an operation requiring much deliberation on the part of an operator, in connection with its results, is a point that has long been regarded as settled, and that it is a formidable operation must, it is thought, be apparent to all who read the account furnished by Dr. Watson. The question, therefore, naturally presents itself, whether, in order to prolong life, it may be right to advise a patient to submit to it. Deeming the relief afforded by it dearly purchased at the risks of the operation, except in very skilful hands, I cannot but think that the dangers of making an opening directly into the stomach, as subsequently referred to by Dr. Watson, in the paper before quoted, is certainly not greater than that incurred in œsophagotomy. The number of instances in which wounds and openings into this organ have not proved fatal will, on examination, be found to be much larger than might at first sight appear probable.¹ In addition to those which I have there mentioned, there is also a case reported by Dr. Watson,² as having been seen by Dr. Archer, of Maryland, in which the stomach was opened more than two inches by a wound with a knife, and the wound so well sewed up by an old soldier with an awl, needle and thread (the stitches being only through the skin), that the patient recovered, though an abscess of some size formed in the groin on the ninth day, as the result of the wound in the stomach, and was afterwards evacuated. The well-known case of St. Martin, and the case reported by Etmüller, where a fistula in the stomach remained open ten years, together with numerous other facts collected by Dr. Watson's extended research, and stated in his paper, also warrant his assertion that an opening into the stomach is an operation that is justifiable in urgent cases of stricture of the œsophagus, and

¹ See Bibliography, p. 101, art. Abdomen.

² Am. Journ. Med. Sciences, vol. viii. N. S. p. 327.

probably quite as favorable to the recovery of the patient, as that of œsophagotomy. In support of his suggestion, Dr. Watson quotes¹ several cases in which fistula communicating with the stomach have continued for years, food being discharged at the opening after each meal; whilst on three different occasions surgeons have incised the stomach for the removal of foreign bodies, and the patients recovered. The removal of a teaspoon by opening the intestines, as was successfully done by Dr. Samuel White, of Hudson, N. York; the excision of a part of the spleen by Dr. Powell, of Kentucky; the wound in the stomach reported by Dr. Ashby,² of Alexandria, and the cases of Drs. Dugas, of Georgia, and Hart, of Mississippi,³ as well as the free incisions made in the peritoneum in ovariectomy, are all instances of the tolerance of patients under wounds of this region, and may certainly be deemed sufficient to justify a surgeon in opening the stomach in the extreme cases of impassable stricture in the œsophagus referred to. But though these cases hold out the prospect of success in the execution of similar incisions, no one, it is presumed, would attempt gastrotomy with the view of nourishing the patient unless specially urged thereto by the peculiar circumstances of the case.

In the event of the distribution of property, or to accomplish some great moral good, or in order to fulfil an important duty to another, a patient might desire to prolong life, if possible, even for a few weeks, and, under such circumstances, it may become imperative on a surgeon to resort to such means as will enable him to obtain the desired time.

CHAPTER V.

OPERATIONS DEMANDED FOR THE RELIEF OF DEFORMITIES IN THE NECK.

THE affections of the neck which lead to such deformities as demand direct surgical interference in the way of an operation, being due usually to contractions either of the skin, fascia, or mus-

¹ Am. Journ. Med. Sciences, vol. viii. N. S. 1844.

² Virginia Stethoscope, vol. i. p. 660.

³ See Bibliography, p. 103.

cles, it is generally necessary to employ some mechanical means either to extend the contracted tissue, or to prevent the reappearance of the deformity after the operation. In most instances, therefore, the assistance to be derived from proper dressings and mechanical contrivances should be remembered, and proper preparations made for their application before any incision is commenced.

The deformities of this region may be subdivided into those affecting the skin and fascia, which are usually the result of burns, and those confined to the sterno-cleido-mastoid muscle, the latter being consequent on various causes.

SECTION I.

DEFORMITIES FROM BURNS.

The destruction of the skin and cellular tissue, consequent on burns of this region, occasionally produces such a contraction of the features as results in hideous deformity, or in an inability on the part of the patient to perform many of the motions of the neck, thus interfering with the action of the head, and preventing the proper execution of such movements as are required in various daily occupations. Among the most serious of these injuries is such an adhesion of the skin of the neck to that of the chest as results in an inability to elevate the head, or such a contraction of the integuments about the chin as renders it impossible to close the mouth, or draw up the lower lip. Under these circumstances, operative surgery is capable of adding much to the comfort and happiness of the sufferer, and, even in very marked cases, has produced results that have been of the most gratifying kind.

In order to appreciate the value of the operations that have been, at different periods, suggested for the relief of deformities from burns, whether on the neck or elsewhere, it is important that attention should be given to the changes produced in the tissues affected, as well as to the almost unvarying tendency of the structure involved to reproduce similar contractile tissues, unless the diseased portion is removed, and the space filled in by healthy structure, the latter being usually obtained by some means similar to those before referred to in connection with the class of plastic operations upon the face.¹

¹ See Part II. p. 325, *et supra*.

In an excellent paper upon Cicatrices and Cicatrization, by S. Laugier, in the *Dictionnaire de Médecine, ou Répertoire des Sciences Médicales*, tome vii., is an extended reference to the pathological changes produced by destruction of the skin, as the result of wounds and similar injuries; and from this and other sources the following account has been condensed.

PATHOLOGY OF THE CICATRICES FROM BURNS.—Delpech having shown that in all wounds which suppurated freely, or did not unite by the first intention, the granulations resulted in the formation of a fibrous tissue unlike the ordinary structure of the part, and which structure he named the “Inodular,” all cicatrices, and especially those resulting from burns, are often spoken of simply as the “Inodular Tissue.”

This tissue is always the result of suppurative inflammation, is manifestly fibrous in its character, of a dull white color, without the shining appearance of fascia or the satin-like character of the surface of a tendon. In consistence and hardness it has been compared to the strongest ligaments of the joints; but its fibres, unlike these ligaments, run in all directions.¹ The contraction of this structure, although at first highly useful in closing any wound, may, by its continuance, create such traction upon surrounding parts as will result in the evils just referred to in connection with burns; and, as it continues to contract for various periods after its formation, Dupuytren established three rules of practical value in the selection of such cases as could be relieved by a surgical operation.

1st. He advises the surgeon not to attempt to correct the deformity resulting from these cicatrices, until many months, or even years, have elapsed after their production.

2d. Never to operate unless certain of obtaining a larger cicatrix than that which it is wished to correct.

3d. To be certain that the operation can restore the parts to their shape; consequently, in cases of ankylosis of a joint, the operation would be improper.

In relation to the different modes of operating, he also gives directions of much value.

1st. In a long narrow cicatrix, he recommends the operator to make several incisions so as to divide the cicatrix transversely

¹ Dict. de Méd., tom. 7^{me}, p. 579, *et infra*.

through its entire thickness, without ever removing any part of it, in order to facilitate its stretching.

2d. To stretch the parts, and bring them into a direction different from that which the complaint had caused, in order to obtain a cicatrix by the production of new skin. This extension must, however, be practised with judgment, lest violent pain, inflammation, and gangrene result, as in a case reported by Delpech.

In salient cicatrices, unaccompanied with retraction, he advises—

1st. To remove the prominence by a subcutaneous section, the knife being introduced flatwise, and made to shave the skin from the cicatrix as far as its extremities, in order to loosen the latter.

2d. To keep the edges of the wound open.

3d. Frequently to cauterize the surface, so as to keep it a little below the level of the integuments.

DELPECH, on the contrary, advocates the removal, as far as possible, of the entire cicatrix, and says that, when this is done, there will generally be found sufficient skin to draw upon, in a direction opposite to that which caused the deformity, thus enabling the operator to obtain immediate reunion.

When it is possible to gain sufficient skin to permit this immediate reunion of parts, the method of Delpech will be found preferable; but, in other cases, a large gaping wound would be formed, which would create even greater trouble than the original complaint.

The decision of either operation will, therefore, necessarily depend chiefly upon the peculiarities of the case presented to each operator at the moment.

In extensive cicatrices about the neck, where it is of great consequence to obtain free motion, without being liable to a modified reproduction of the difficulty from the newly-made cicatrices, some of the various autoplasmic operations will prove especially serviceable.¹ In these operations, the ordinary principles of plastic surgery must be followed out, and the flap, which should if possible be taken from a part of the skin where it is healthy, made of such a size as may be demanded to fill up the wound left by dissecting out the cicatrix, or by destroying its adhesions. This flap, allowance being made for its contraction, should be closely attached to the edges of the wound by numerous points of the interrupted suture,

¹ See Plastic Operations on Face, Part II. p. 325.

and then the sore left by the removal of the flap, either united or allowed to heal by granulations.

In a paper by Dr. Thomas D. Mütter, upon the relief of deformities from burns,¹ these principles have been well illustrated, and, from among several of the cases there reported, the following has been selected as applicable to the more severe injuries of this character.

OPERATION OF DR. MÜTTER FOR THE RELIEF OF CICATRICES FROM BURNS ON THE NECK.—The patient, a young woman, aged twenty-eight years, had been burnt twenty-three years previously upon the face, throat, and upper part of the thorax, from her dress taking fire. She had been unable to throw her head to the left side, or backwards, or to close her mouth for more than a few seconds during the whole time. The right eye was also drawn down some distance below the other, and when an effort was made to turn the head, the eye became closed. The chin was drawn to within one inch and a half of the top of the sternum, and this place was so filled up by the cicatrix, that no depression existed in front of her neck.

OPERATION.—The patient being placed in a strong light, on a low chair, with her head thrown back as far as possible and sustained by an assistant, an incision was commenced on the outside of the cicatrix in the *sound skin*, and carried across the throat into the *sound skin* on the opposite side. This incision penetrated through the integuments as near the centre of the cicatrix as possible, and was about three-fourths of an inch above the top of the sternum, the object being to get at the origin of the sterno-cleido-mastoid muscles, which, in consequence of the long-continued flexion of the head, were not more than three inches long.

After exposing the muscles, a director was passed under that of the right side, and both its origins divided. The sternal origin of the left muscle was next divided in a similar manner, when it was found that the head could be placed in a proper position. The elevation of the chin now left a wound six inches long by five and a half wide, to fill which, a flap was formed from the shoulder by an incision which, commencing at the left end of the wound in the neck, extended downwards and outwards over the deltoid muscle, so as to furnish an oval piece of integument six inches and a half

¹ See Bibliography, p. 82. Deformities of the Neck.

PLATE XXXIII.

OPERATIONS PRACTISED ON THE NECK.

Fig. 1. A view of the Lymphatics, together with the Bloodvessels and Nerves found on the side of the Neck. 1. Carotid artery. 2. Par vagum nerve. 3. Internal jugular vein. 4. Subclavian artery. 5. Subclavian vein. 6. Brachial plexus of nerves. 7. Lymphatic vessels and glands. 8. Phrenic nerve. 9, 9. Sterno-hyoid and sterno-thyroid muscles. 10. Thyroid gland. 11. Superior thyroid artery. 12. Lymphatic gland, situated on temporal vein. 13. Lymphatic, at angle of jaw, imbedded in parotid gland, and liable, when diseased, to be mistaken for enlarged parotid. 14. Three superficial lymphatic glands on course of sterno-cleido-mastoid muscle. 15. Deep-seated lymphatic at lower part of jaw. 16. Facial artery and vein. 17. Lymphatic gland in advance of submaxillary. 18. Submaxillary gland. 19. Three superficial lymphatics behind sterno-mastoid muscle. 20. A large lymphatic gland situated outside, but adjacent to sheath of bloodvessels. 21. A chain of lymphatic glands which extend from side of neck to beneath the clavicle between the trapezius and sterno-mastoid muscles. All the lymphatic glands above referred to are the occasional seat of tumors in the neck. After Bonnamy and Beau.

Fig. 2. Effects of a Cicatrix from a Burn of the Neck. After Nature.

Fig. 3. Myotomy as practised for the relief of Torticollis. 1. Right hand of surgeon in the act of inserting the tenotome beneath the skin. 2. His left hand raising the muscle. After Bourgery and Jacob.

Fig. 4. A view of the position and development of a Carotid Aneurism. 1. Common carotid artery. 2. Aneurismal sac. 3. Par vagum nerve displaced by the tumor. 4. Hypo-glossal nerve forced downwards and forwards by the growth of the tumor. 5. Internal jugular vein. 6. Sterno-cleido-mastoid muscle and skin drawn to one side by 7, a curved spatula. After Nature, and John Bell.

Fig. 5. Ligature of Arteries about the Neck. L. Ligature of the lingual artery. 1, 1. Ligature passed beneath the artery. 2. Stylo-hyoid muscle. 3. Hypoglossal nerve. 4. Digastric muscle. 5. Incision through skin and fascia. 6. Platysma-myoides muscle. After Bourgery and Jacob.

C. Relative position of the parts concerned in Ligature of the Primitive Carotid. 1. Upper end of incision. 2. Skin and fascia. 3. Abnormal arterial branch from arch of aorta to pharynx, running parallel to carotid artery. 4. Common carotid. 5. Descendens noni nerve. 6. Par vagum. 7. Internal jugular vein drawn aside. 8. Sterno-cleido-mastoid muscle held back. 9. Blunt hook. After Auvert.

A. Ligature of Axillary Artery. 1, 1. Line and extent of incision. 2. Pectoralis major as divided. 3. Axillary artery. 4. Ligature placed beneath it. 5. Axillary vein. 6. Brachial plexus. 7. Pectoralis minor muscle. After Bourgery and Jacob.

Fig. 1

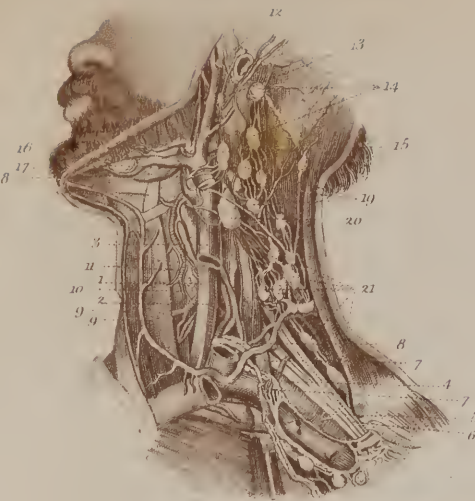


Fig. 2



Fig. 3



Fig. 4



Fig. 5



long by six wide, which was left attached by its base at the upper part of the neck. On dissecting this flap free from the shoulder, it was twisted by a half turn on its pedicle, brought round into the wound on the front of the neck, and retained there by numerous twisted sutures and adhesive strips; after which, the wound on the shoulder was closed as far as possible by sutures and strips. The head being now carried backwards, and maintained in this position, the patient was put to bed, and union by the first intention took place throughout the entire wound, with the exception of one small point which healed by granulation.¹

Some additional steps relieved the eye and mouth; and, twelve months subsequently, the cure of the patient was complete.

SECTION II.

TORTICOLLIS, OR WRY NECK.

By the term Torticollis, or Wry Neck, is usually designated such distortion of the head, from muscular contraction, as brings the back part of it forwards, downwards, and sideways, so as sometimes to turn the chin upwards and over the opposite shoulder, the former being raised in proportion as the occipital bone is drawn down. Although disease of the vertebræ, injuries of the skin, or other causes, may create this deformity, the present account will be limited to the consideration of such cases as are mainly dependent on an unnatural and permanent contraction of the sterno-cleido-mastoid muscle.

Among the various causes that excite this deformity, there is sometimes seen an unnatural contraction of one muscle, in consequence of the partial paralysis of that of the opposite side, the contracted muscle being generally felt like a tense prominent cord, or, if not distinct, readily made so by any effort to turn the head towards the sound side. To relieve this condition of things, and bring the chin again to its natural line, the operation of myotomy, or the subcutaneous division of the muscle or its tendon, and the application of a suitable apparatus for making moderate extension

¹ Am. Journ. Med. Sciences, vol. iv. N. S. p. 69; also Op. Surg., by J. Pancoast, M. D., p. 359.

of the muscle, and preventing the future contraction of the new tissue formed in the line of the incision, is especially calculated.

When, after an examination of the origin of the complaint, its existence is found to be mainly due to a contraction of the muscle, stimulating frictions, electricity, galvanism, and manual efforts to restore the head to its proper position may be first resorted to; but when, after a trial of these and similar measures, little progress is made towards a cure, the division of the muscle or its tendon will materially expedite the result.

OPERATION.—Various modes of operating have been suggested by different surgeons, in order to accomplish the accurate yet safe division of a muscle, which is known to be so closely connected with important bloodvessels and nerves throughout most of its course, as the sterno-cleido-mastoideus. These suggestions differ, however, mainly in the shape of the knife or in the point at which the muscle may be most advantageously incised; but, as the subcutaneous division is preferable to the old plan of dissecting down to the muscle, the description of the operation will be limited to this mode of operating.

In the United States, the simplicity of the operation, or its frequent performance, has apparently prevented the publication, by surgeons, of such details as would be most serviceable to an inexperienced operator, and the two papers published by the gentlemen hereafter quoted will, therefore, be found to furnish the principal exposition of the views of surgeons, in this country, of an operation, the utility of which has been doubted.

OPERATION OF DR. J. MASON WARREN, OF BOSTON.—A boy, sixteen years of age, having fallen from a height when four years old, was shortly afterwards found to labor under Torticollis. At the time of the operation, the head was drawn to the left side, the ear usually resting on the left shoulder, though it could be slightly raised, the inclination to one side being accompanied by such a rotation of the head as caused the face to regard the right shoulder. There was also a lateral curvature of the spine, the left shoulder being the highest. The sterno-mastoid muscle of the left side, on being examined, was found to be strongly retracted, whilst the deep-seated muscles of the neck, the scaleni especially, could also be distinguished in an unnatural state of rigidity, the sterno-cleido-mastoid being, however, the chief obstacle to the proper position of the head. In addition to these changes, the whole of the left side

of the face was atrophied, and each of its component parts much smaller than those of the opposite side. This alteration of the features has been attributed by M. Guérin to the distortion which the great vessels of the neck experience in consequence of the deformity, whilst the curvature of the spine is regarded as due to the inclination of the cervical vertebræ on the dorsal, of the dorsal on the lumbar, and the lumbar on the sacral, in order to obviate the displacement of the head, and bring it within the axis of the body.

In consequence of this condition of things, Dr. Warren determined to divide the sterno-mastoid muscle at its sternal origin, the opinion being entertained, as suggested by Guérin, that the complaint was mainly due to the retraction of this portion of the muscle. Accordingly, its division was accomplished as follows:—

OPERATION.—The head being well supported and carried a little forward, so as to throw the muscle outward from the subjacent parts, a puncture was made with a lancet through the skin about six lines above the clavicle, between the sternal and clavicular origins of the muscle. A narrow blunt-pointed knife (Bouvier's) was then introduced with its flat side towards the muscle, carried behind the sternal origin, its edge turned towards the muscle, and the section completed by a slight sawing motion, the effects being indicated by a distinct cracking sound and by the partial restoration of the head to its natural position. The little wound in the skin being then closed by plaster, a cap was placed on the head, to the back of which, opposite the right mastoid process, was attached a strap, which, being drawn tight, was secured over the breast of the same side. A stiff stock was also subsequently added to the dressing, and, in the course of a fortnight, a great change in the position of the head was perceptible, though it yet remained somewhat inclined to the left, the clavicular origin of the muscle having become more prominent since the division of its sternal attachment. To remedy this, it was, therefore, decided to divide the clavicular origin also, which was accomplished as follows: The head being well supported, and the muscle sufficiently relaxed by inclining it to this side, the body of the muscle just below the union of its two origins, was readily seized between the thumb and fingers, and completely isolated from the subjacent parts. A sharp-pointed knife was then carried beneath the muscle, until it could be felt under the skin by the finger on the opposite side, when, the patient being directed to contract the muscle, its section was readily accom-

plished. In forty-eight hours the wound was healed, and nine months after the operation the patient's appearance was so much improved that his former friends could scarcely recognize him.¹

OPERATION OF DR. J. C. WARREN, OF BOSTON.—A little girl, nine years of age, also much distorted, was operated on as follows:—

The head being supported, and the muscles rendered tense, a narrow sharp-pointed bistoury was passed flatwise between the skin and the sternal origin of the muscle from without inwards (Plate XXXIII., Fig. 3), and, the edge of the knife being then directed upon the muscle, its division was accomplished. The knife being now withdrawn and again entered at the same orifice, was carried in front of the clavicular origin of the muscle, which was divided in a similar manner. Bandages, similar to those employed in the preceding case, were then applied, and two months after the operation her head was so nearly straight that the deformity was not perceptible to ordinary observers.²

Dr. John W. Brown, of the Boston Orthopedic Infirmary,³ after dividing the muscle, employs a simple yoke to which bands from a cap are attached, and has published in a paper on the subject an expressive drawing of the apparatus, of which my present limits forbid a description. In Plate XXXV., Fig. 14, may, however, be seen a contrivance, made by Rorer, of Philadelphia, which I have found to be well adapted to the object in view.

REMARKS.—Having formerly followed closely the practice of M. Guérin in Paris, and also noted the results of such patients as have been presented to me in the United States, I am induced to think that more or less benefit will be derived from the section of this muscle in most of the cases which are unaccompanied by deformities in the bones, whilst, in those solely dependent on a contracted condition of the muscle, a perfect cure may be anticipated. Of the various modifications suggested in the performance of the operation, there are none of great consequence; though the section of the muscle from before backwards, as practised by Dr. John C. Warren and others, is, I think, the safest. In operating in this manner, attention should be given to the position of the external jugular vein as it approaches the subclavian vein; and when the knife is upon the muscle, the division of the latter will be most

¹ Boston Med. and Surg. Journ., vol. xxv. p. 123.

² *Idem.*, p. 124.

³ *Idem.*, vol. xxvi. p. 58.

safely accomplished by holding the knife firmly against the muscle, and causing the latter to press against the knife by carrying the head in such a position as will make the muscle prominent. A narrow straight bistoury, or a knife, like that in Plate XXXV., Fig. 13, makes so small a wound that, if care is taken to exclude the air, but slight inflammation will ensue upon the operation.

Much of the success of this operation will, however, depend on the proper employment of mechanical means subsequently. The apparatus (Plate XXXV., Fig. 14), before referred to, is simple and efficient; but a nightcap and bandage, a tin frame, or any other contrivance which will enable the surgeon to draw the head into the proper position, will often be found to answer quite as well. The division of the muscle, it should be recollected, only facilitates the cure; the mechanical treatment accomplishes the most important part of it, and also prevents that reproduction of the deformity which is likely to ensue, when means are not taken to obviate it.

CHAPTER VI.

TUMORS OF THE NECK.

THE word Tumor (*tumeo*, I swell) has been employed by Boyer to designate "any preternatural eminence developed in any part of the body;" by Hunter, as expressive of "a circumscribed substance, produced by disease, and different in its nature and consistence from the surrounding parts;" whilst by Professor Miller, of Edinburgh, it is applied to "any morbid growth or new structure which is the result of perverted nutrition in a part, independent of the inflammatory process otherwise than as an exciting cause; and possessed of a power of formation and increase distinct from those of the original tissues." These definitions, though not universally applicable, are, however, sufficiently correct to present any one with a good idea of the most general characters of this class of disorders, and in that of Mr. Miller may also be found a brief account of their physiology. As the changes of structure which result in tumors may happen in all parts of the body, and as the account of the pathology of the various kinds has been found sufficient to occupy

entire volumes, no attempt can possibly be made in the present limits to investigate the subject in all its details. In the excellent volume by Dr. John C. Warren, of Boston,¹ may be found the results of many years of study, combined with the experience furnished by a long life of observation, and to this work, as well as to the article on Tumors to be found in Miller's *Principles of Surgery*, the reader is referred for such an account of the general pathology of these formations as would extend these pages beyond their proper bounds. Without, therefore, doing more than mention some of the different species of tumors found in the neck, as well as elsewhere, I shall at present confine myself to a few general remarks on such of the varieties found in the neck as require operative interference, and to a brief allusion to the means of diagnosis applicable to most of them.

SECTION I.

GENERAL PATHOLOGY OF TUMORS OF THE NECK.

No matter what may be the peculiar characteristics of the tumors found in this region of the body, no one can for a moment regard their growth, without being curious to know in what way they have originated, and what tissue has been made the nidus for their development.

The causes of tumors of the neck may, like those seen elsewhere, be very varied; thus a blow, strain, cut, burn, or chronic inflammation, may all, under proper conditions of the system, result in the development of a tumor. In most instances, it may justly be presumed that these causes only produce a modification of healthy inflammatory action, and that the abnormal growth originates, therefore, like the healthy tissues, in the deposit of a blastema, which, instead of being reparative in its character, or proceeding to the production of a healthy structure, results in the formation of one whose character is dependent on various circumstances. Thus, a very slight modification of the primitive cell may result in the production of what has been justly designated as an Analogous tumor or a growth bearing considerable resemblance to the ordinary

¹ Surgical Observations on Tumors, with Cases and Operations. Boston, 1839.

textures, whilst the influence of constitutional causes may lead to the formation of a Heterologous growth, or one which differs widely in its appearance, general arrangement, and subsequent progress from that which usually results from healthy or euplastic lymph.

In the neck, as in other portions of the body, the changes in the nutritive action of a part may result in simple induration, hypertrophy, or increased formation of normal textures, or in the deposit of cacoplastic lymph and morbid matter in the lymphatic glands, or in the reticulated structure which is so freely developed throughout this region. Whether the new growth be Benignant or Malignant, it generally produces some change in the surrounding parts; thus, in most tumors, the surrounding cellular tissue becomes indurated, lamellated, or cystiform, so as to surround them with a perfect sac; the muscular structure atrophied or hypertrophied, the first being the more common; the fascia either increased or diminished in density; the larger vessels thickened or contracted; the capillaries engorged and augmented in size, whilst the whole arrangement of parts will be more or less displaced in proportion to the tension of tissue created by the growth of the tumor. So varied, however, are the positions, structure, character, and modifying influences seen in different cases of tumors, that it is impossible to lay down concisely anything like a general law of progress. Usually, the surgeon will not widely err in prognosticating the changes that he will meet with in removing tumors of the neck, if he bears in mind the facts that, with the exception of the dermoid class, all tumors of this region are covered by a fibrinous expansion which limits their external development and causes pressure on adjacent parts; and that the progress of the inflammation excited around the mass will necessarily produce all the changes likely to result from this process elsewhere, such as serous or fibrinous effusions, adhesions, increased or diminished vascularity, and a general matting together of parts usually distinct.

In the various attempts that have been made to group the different kinds of tumors, writers have always found it difficult to arrange them so that the classification would be accurate; the varied degrees of departure from healthy structure exhibited by different cases preventing anything more than an approximation to their character. Among the older writers, the terms fleshy, fatty, pulpy, honey-like, or encephaloid, designated their appreciation of the

sensible characters of each class; whilst Abernethy and Laennec described them as pancreatic, mammary, medullary, tuberculated, melanotic, and carcinomatous sarcoma. Müller has more recently divided them according to their chemical nature, microscopic character, and mode of development, into fatty, jelly-like, and albuminous tumors, such substances being a principal characteristic in all of these growths, though the proportions in each may be very varied.

"The chemical constitution of tumors shows that the principles chiefly found in the mare fat, gelatin, and albumen, and according as any of these predominate, the nature of the tumor is found to vary. Those which consist chiefly or wholly of fat contained in a cellular parenchyma, are analogous, simple, and non-malignant. Those which, by long boiling, are reduced almost entirely to gelatin are also non-malignant, and those which consist mainly of albumen include both analogous and heterologous formations; some being malignant and others benignant, the carcinomatous being almost entirely composed of albumen.¹

All tumors of the soft tissues are either solid, or contain solid and liquid matter, more or less combined and variously arranged, consisting either of a more or less compact fleshy growth, whose enveloping cyst is entirely a secondary formation,² being formed chiefly at the expense of the surrounding cellular tissue, or of a cyst, which is the original structure, and maintains the bulk and increase of the tumor by its secretory power.³

The solid tumors embrace those known as sarcomatous, adipose, fibrous, cartilaginous, osseous, and cysto-sarcomatous, all of which are benignant; the tubercular or scrofulous, which is specific in its nature; and the carcinomatous, melanotic, medullary, and fungoid, which are malignant.

In studying merely the surgical treatment of tumors, many may be disposed to say that the peculiarities of each of these classes are a matter of little importance, provided the tumor is causing such a train of symptoms as renders it essential to the patient's safety or comfort that it should be removed. Though unwilling to admit the truth of such an assertion, the character of the present volume renders it inexpedient to spend more time on matters which

¹ Miller's Principles of Surgery, p. 388. Philad., 1845.

² Miller, p. 392.

³ *Loc. cit.*

are truly within the province of the principles of surgery. Attention will, therefore, now be directed to the means of diagnosing the probable constituents of the tumor as well as its relations to surrounding parts.

§ 1.—DIAGNOSIS OF THE CHARACTER AND POSITION OF TUMORS OF THE NECK.

In diagnosing these growths, the senses of sight and touch are those mainly required to arrive at a correct conclusion, though that of hearing may occasionally be called into play, in order to detect vascular disorders or connections.

I. THE CHARACTER OF TUMORS.

On looking at a tumor in the neck, the general shape and position of it should first be noticed. Tumors involving the glandular structures, and especially those of the lymphatic glands, will generally be seen to be nodulated or irregular, provided effusions into surrounding parts have not created such changes in the integuments as would equalize their surface. Those which are encysted or fatty are, on the contrary, more smooth on the surface, and globular. Pulsation, change in the color of the skin, as blueness or redness, together with a turgescence of the superficial veins, are also points that should attract the eye in this primary investigation.

On feeling the tumor, a judgment should be formed of its solid or fluid character, of its hardness or softness, of its attachments to surrounding tissues, of its pulsations, and of its sensibility. Hardness will generally characterize albuminous deposits, the majority of which are malignant; elasticity, amounting almost to a sense of fluctuation, characterizes the fatty class, whilst, unless the sac is very full, or the contents decidedly jelly-like, fluctuation and the presence of liquid may be readily told. Occasionally, the position of a tumor, and its confinement by the fascia, give to it a sense of pulsation that might lead to the supposition of its being a vascular enlargement. Under these circumstances, an effort should be made to elevate it from the subjacent artery; or the circulation be stopped in the latter by pressure and the change in the size of the tumor

noted; or the ear may be applied and the peculiar aneurismal whirl listened to. Some surgeons, in addition to these means, aid their diagnosis by introducing a grooved or cataract needle into the tumor, and noticing the character of what escapes, or the sensation of solidity given by the passage of the needle. When other means have failed, and a consultation are in doubt, or when the operator is prepared to remove the tumor at an early period, it may be useful to resort to this instrument; but personal experience has induced the opinion that, as a general thing, this aid to diagnosis is liable to abuse and to the production of injury. If the tumor prove to be malignant, its development will frequently be rapidly accelerated by such an application. To assist such as are not familiar with the general aspect of different tumors, and thus diminish the necessity for the use of the lately fashionable grooved needle, the following brief account of their external characters is presented as collected from various sources, but especially from Miller's *Principles*.

THE SIMPLE SARCOMATOUS TUMOR has a smooth surface, a tolerably firm doughy feel; does not fluctuate or give any sensation approaching fluctuation; is not painful even when freely handled; is loosely attached, and does not implicate adjacent parts; increases slowly and without pain; possesses no more vascularity than a similar bulk would naturally have, and varies from the smallest to the largest size, weighing often many pounds. An example of this kind of tumor may be seen in Plate XXXIV., Fig. 1.

THE ADIPOSE TUMOR, often designated as the Lipomatous tumor, may be either lobulated or non-lobulated, flat, globular, oval, or cylindrical, and either smooth or studded on the surface with small nodules. When touched, it is occasionally so elastic as to give a sensation closely resembling fluctuation, and requiring considerable skill to avoid an error in this respect. When handled, it is free from pain; the skin is pale, loose, and movable at first; but it and the tumor may become adherent by time and increased development of the complaint. The growth is slow and steady, and if the tumor is pedunculated, the skin will be stretched and elongated, so as to resemble the neck of a sac. (Plate XXXIV., Fig. 3.)

THE FIBROUS TUMOR is the most dense and firm of the benignant class, being composed chiefly of dense fibrous matter. Its shape is generally globular, the surface often nodulated, and the investing cyst thick, strong, and slightly adherent to the tumor. It is gene-

rally perfectly circumscribed, movable, independent of adjoining tissues, painless, and slow of growth; but it often causes trouble by degenerating into the malignant structures, or by compressing adjacent vessels and nerves.

Examples of the lymphatic and encysted tumors may be seen well delineated in Plate XXXIV., Figs. 2 and 4.

II. THE POSITION OF TUMORS.

The large number of lymphatic glands found in the neck, and the knowledge of their ordinary position, render a diagnosis of many of the tumors of this part more easy than might at first sight be supposed. According to the views of Allan Burns, nearly all the glandular tumors of the neck may be referred to two classes, those which are without and those which are within the fascia, the existence of either being recognized by their mobility, or the ease with which they can be drawn from their ordinary position.

On examining the structures mainly concerned in this class of tumors, it will be found that the great chain both of the superficial and deep-seated lymphatics of the neck follow the course of the superficial and deep-seated veins (Plate XXXIII., Fig. 1). In the healthy condition, these glands are for the most part flattened and oval, varying from two to nine or ten lines in length. Of the superficial glands there are, between the skin and the insertion of the sterno-mastoid muscle, from four to six; in the interstice between the clavicular origin of the sterno-cleido-mastoid and the anterior edge of the trapezius, just above the clavicle, and bordering on the external jugular vein, are half a dozen; between the skin and the parotid gland there are two, one above or near the zygoma, and the other below near the angle of the jaw. Disease and enlargement of the latter are very apt to be mistaken for an affection of the parotid itself. In the early stages of this tumor, its movable character will, however, prevent such an error in connection with the parotid. Around the submaxillary gland, especially at its anterior and posterior extremities, there are eight or nine, and in it as well as in the parotid, are lymphatic vessels and smaller glands which are the primary points from which the disorder of these structures originates. The deep lymphatic glands of the neck are also very abundant; they are placed along the sheath of the carotid artery and jugular vein, and between them and the anterior edge of the

PLATE XXXIV.

APPEARANCE AND POSITION OF SOME OF THE TUMORS SEEN ABOUT THE NECK.

Fig. 1. Large Sarcomatous Tumor of the right parotid region, caused by the development of a sebaceous follicle in consequence of a blow upon the part. Commencing as a lump the size of a nut, this tumor gradually increased to nearly the size of the head; gave exit at one time to sebaceous matter; had a broad base; was nearly immovable; had the veins enlarged upon its surface, and showed a small ulceration in front, from which fetid, acrid, and bloody sanies had escaped. As the tumor enlarged, the jaw became closed; sensation of the face diminished, and there were all the other symptoms due to pressure on the vessels and nerves of the part. The tumor differs in appearance from scirrhus of the parotid gland in its size and period of development. It was readily removed, and is represented as an example of one of the class of tumors of the parotid region not involving the parotid gland.

After Auvert.

Fig. 2. Large Tumor of the Neck dependent on degeneration of the lymphatic glands of the neck. Arising as a small swelling caused by an enlarged gland below the angle of the jaw, it gradually increased until it occupied the entire side of the neck, involving many glands, and reaching from above and behind the ear to below the clavicle, so as to turn the head to the opposite side. Its appearance was that of an irregularly lobulated mass: it was unaccompanied by pain, was perfectly firm and hard, and gave no sense of fluctuation at any point. Under the use of chloroform, it was successfully removed by Dr. Mott.

After Mott.

Fig. 3. Appearance of an immense Adipose or Lipomatous Tumor of the Neck. This tumor was not painful; had no pulsation; was formed of numerous large lobes, with the superficial veins distended over them, and was attached to the neck by a large pedicle which extended from the angle of the lower jaw on the right side, down to the sterno-clavicular articulation; its weight being so great that the patient could hardly retain the erect position. The tumor was found to be covered by a strong capsule formed of the surrounding cellular tissue, and to have originated in a hypertrophy of the surrounding adipose tissue.

After Auvert.

Fig. 4. A large Encysted Tumor of the left Parotid and Submaxillary Regions, which was to the touch semi-elastic, unequally lobulated, and due to a chronic irritation of one of the sebaceous follicles, the duct of which had become closed, and thus caused a retention and degeneration of its secretion.

After Auvert.

Fig. 1



Fig. 2



Fig. 3

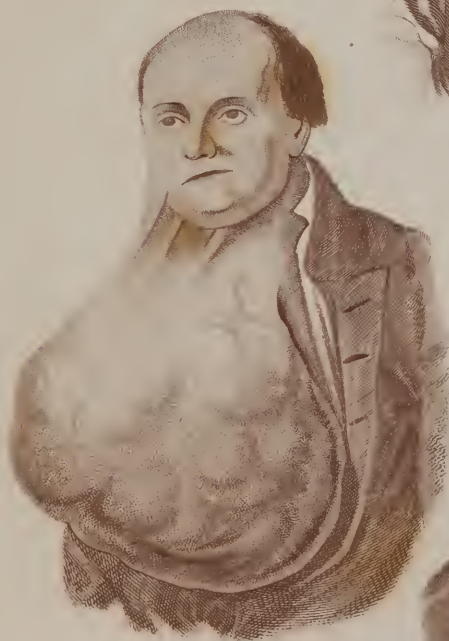


Fig. 4



trapezius are about twenty. When enlarged, these glands project beyond the sterno-cleido-mastoid muscle at its posterior edge, and in the removal of some of them a section of the muscle may be required. Between the inferior edge of the thyroid gland and the sternum, on the trachea, are four, and a chain of them extends from these around the œsophagus, trachea, and bloodvessels towards the heart¹ (Plate XXXIII., Fig. 1).

The tumors, formed at the expense of the deep lymphatics, are exceedingly liable to contract adhesions, especially to the sheath of the vessels, so that their extirpation will involve these parts so directly as to lead to danger unless caution is exercised. As a class, these tumors are more fixed, and the finger cannot be passed around them in the same manner as is often the case in the superficial glands. When a tumor in the neck of a solid, or apparently semi-solid consistence, is seated nearly on a line with the upper portion of the larynx or towards the angle of the jaw, or close to the posterior edge of the sterno-mastoid muscle, and seems to elevate the muscle, or is rendered more movable by relaxing the latter, it will often prove to be directly over the course of the great vessels if not attached to their sheath. When a tumor in the neck is large, pediculated, or shows a tendency to extend and elongate the skin, so as to become pendulous, its attachments will generally be superficial. But if the size of the tumor is not large (say not larger than a lemon), if it is round or flat, hard, bosselated, and not easily moved, or excites doubts as to its mobility, especially if its attachment is near to, and in the line of the sterno-cleido-mastoid, it may be taken for granted that it is deep-seated. A small tumor not larger than a walnut, and apparently upon the edge of the sterno-mastoid muscle, and whose removal seemed to be a very simple affair, was undertaken by a fellow practitioner. Having noticed the liability to error of diagnosis in such cases, I was prepared for hemorrhage, and, in a very few minutes, was compelled to tie the internal jugular vein with two ligatures, the vein and sheath of the vessels being so adherent to the base of the tumor as to mislead the operator as to its actual position. So deceptive are the attachments of all tumors of the neck, that it has been justly said "that no one can tell how far he may be compelled to go in order to remove them, until he has completed the operation."

¹ U. S. Dissector.

SECTION II.

OPERATIONS FOR THE REMOVAL OF TUMORS OF THE NECK.

In the treatment of the morbid condition of structures as varied as those connected with tumors in the neck, it must evidently be impossible to lay down any general mode of operating, that would be applicable even to a majority of the cases that may be met with. Surgical writers have, therefore, generally been satisfied with furnishing directions in regard to the form of the external incision, or in recommending that, in all operations for the removal of tumors, the skin should be cut so as to create as little deformity as possible, whilst, at the same time, the deep-seated attachments of the structure to be removed are freely exposed. In the neck, the latter recommendation is especially serviceable, as too much stress may be laid on the deformity likely to arise from the cicatrix. When compared with the increased difficulty liable to be caused by a limited incision, the inconvenience created by the deformity from a cicatrix does not deserve a moment's consideration. Wounds of the skin, it is well known, generally unite with great facility, whilst a free incision, by enabling the operator to see distinctly the structures upon which he is acting, will greatly accelerate the accomplishment of his object, and save the patient much unnecessary risk and suffering. From the importance of the parts connected with tumors in the neck, the first object of the operator should certainly be to accomplish the removal of the disease with safety and certainty, and nothing will aid this purpose so much as a free external incision; the subsequent dissection being, if necessary, more limited in its extent. The choice of the shape of an incision will also often exert considerable influence upon the success of the operation; and a brief reference to the adaptation of each of them to special cases may, therefore, prove serviceable.

The straight incision is especially applicable to the removal of small and superficial tumors, or those situated directly beneath the skin. The elliptical incision exposes a part more freely, and is chiefly resorted to when it is desired to remove an excess of integument, as in the case of a large or pendulous tumor. The V incision is more free, and adapted to tumors of moderate size, so situated as to render it necessary to insure the safety of particular parts; whilst

the crucial or the T, and especially the former, will be found the best in all cases where the tumor is large, and likely to require a free dissection. But no matter what line of incision is selected, it is essential that the external or primary cut should extend at least to the very circumference of the base of the tumor, as seen through the skin, and in many instances it will be found advantageous to carry it a few lines beyond this point. After incising the skin, there are certain rules which are applicable to the removal of the majority of tumors, and the observance of which will prove highly useful to those who have yet to gain their experience. Thus, Dr. Alexander H. Stevens, of New York, in an able lecture on the removal of tumors, directs the operator first to cut down to the tumor before commencing its dissection; and, second, to remove the whole of the tumor, and nothing more.

Malgaigne also advises that the dissection should be made by extensive cuts (by which I understand the sweeping motion of a good dissector, and not the hacking and pricking of tissue occasionally seen), the edge of the scalpel being directed as much as possible from those parts which it is important to leave untouched, whether they be in the tumor or in the healthy structure. In connection with the dissection, conducted in the neighborhood of important organs, whether nerves, vessels, or muscles, he also directs that they should be drawn or put to one side by means of blunt hooks, the fingers, or forceps. When the principal portion of the tumor is removed, especially if it is of a suspicious character, the surgeon should endeavor to satisfy himself that no particle is left behind, lest it serve to reproduce the disease; and when any of the remnants are thus found, they should be removed either with the knife or scissors, the wound being left undressed until all the vessels are tied and the flow of blood arrested, when an effort may be made to heal it by the first intention.¹ On this latter point surgeons have always differed, and in this case I must dissent even from such good authority as Mr. Malgaigne is generally admitted to be. In tumors of any size above that of a walnut, union by the first intention will not usually be possible, especially if ligatures have been required, and individual observation has rather led me to the observance of the practice of the late Dr. Physick, in the introduction of a little slip of linen at the inferior angle of the wound, so as to insure a

¹ Malgaigne, *Op. Surg.*, Philad. edit. p. 104.

vent for any pus that may be secreted. The surface of an incised wound generally unites without difficulty; but the deeper-seated parts are more obstinate, and in the neck it is especially important that pus should be prevented from burrowing, and that a free vent should be guaranteed it by other means than those furnished by bringing the ligatures out at the lower angle of the incision.

In the extirpation of tumors about the neck, Langenbeck¹ proceeds as follows: He first makes a free division of the integuments, dissects the muscles from over the tumor, but avoids cutting through or injuring them if possible, thus making the tumor sufficiently movable, whilst by preserving the muscles he is enabled to know accurately the place of the chief bloodvessels. Then, when the surface of the tumor has been cleared, its separation is to be commenced on that side which presents the least risk, or where the least considerable vessels are, and the dissection carried from thence towards the more hazardous portions. This distinguished surgeon has also recommended that the knife should not be introduced deeply where there are any large bloodvessels, but that the tumor should be strongly pulled outwards, so as to separate it from the vessels, and put the cellular substance around them on the stretch. The latter recommendation will be found especially serviceable, and the operator will be well able to carry it out if he takes the preliminary step of passing a strong ligature deeply into any solid tumor immediately after incising the skin.

Directions like those of M. Langenbeck, though of a general kind, should be firmly impressed on the mind of every surgeon, when operating on tumors of this portion of the body, or indeed elsewhere. In every operation upon tumors in the neck, the surgeon should always be on the watch, to prevent the entrance of air into the veins, and, when it occurs, immediately resort to stimulants to the nostrils, frictions, and artificial respiration, in order to restore the heart's action. But, though sufficiently useful, as far as they go, they do not furnish such an accurate account of the best mode of overcoming the difficulties likely to be met with in the removal of tumors from the course of the great vessels of the neck as is desirable, and I have, therefore, made a selection of a few difficult cases, with a view of furnishing the best possible substitute for the individual observation of any young operator, viz: the experience

¹ Cooper's Surg. Dict., by Dr. D. M. Reese, New York, p. 377.

of those whose skill and lifelong practice have enabled them to contend with difficulties in every shape. As these cases contain important practical precepts, they are furnished in full, in order that nothing of the details of the extirpation of tumors in this region may be overlooked.

§ 1.—REMOVAL OF LARGE LYMPHATIC GLANDULAR TUMORS.

OPERATION OF DR. VALENTINE MOTT, OF NEW YORK.¹—A little boy, five years old, had a tumor on the neck which had resisted every plan of treatment. It occupied the entire side of the neck, reaching from above and behind the ear to below the clavicle, going underneath and also lapping this bone. In front, it passed beyond the central line of the larynx and trachea, crowding these parts to the opposite side; and behind, it passed under the trapezius muscle, so as to turn the head also towards the opposite side. In appearance, the tumor was irregular and lobulated, whilst to the touch it was firm and without fluctuation at any point. (Plate XXXIV. Fig. 2.)

The patient being placed completely under the influence of chloroform, the operation was then commenced.

OPERATION OF DR. MOTT.—In order to command the whole tumor, a crucial incision was made in the integuments, the first cut extending from behind the ear to the clavicle, and the second a little obliquely to this from the anterior to the posterior edges of the tumor, so as to traverse the longest axis of the whole mass. These incisions being carefully conducted through the skin, platysma myodes and under layer of the superficial fascia so as fairly to denude the tumor, the dissection of the lower flap was first commenced, the veins and arteries being tied as they were divided. In dissecting off this flap, the mastoid muscle was found to be so incorporated with the tumor as to make it necessary to divide the muscle about two inches from the sternum and clavicle. This division exposed the lower portion of the tumor, and showed the internal jugular vein running through its substance. On the inner side of the mass, the common carotid artery could be dissected bare for several inches, but the vein was so imbedded in the tumor that it was totally impracticable to save it. Being, therefore, seized with a pair of forceps,

¹ Transact. New York Acad. of Med., vol. i., part i., p. 90. New York, 1851.

it was divided, and a ligature instantly placed beneath the forceps, the upper end being held by the fingers of an assistant, whilst the dissection was continued. The tumor being thus separated from the vein was found to have destroyed by its pressure the sterno-hyoid and sterno-thyroid muscles, and was now detached from the upper and inner edge of the clavicle as far as the anterior edge of the trapezius muscle. Getting under the mass in this way, the tumor could be more readily and safely detached from the parts below, and, on dissecting it from over the scalenus anticus, careful attention was given to the phrenic nerve. The posterior and upper part being then dissected from over the mastoid process and turned down, a portion of the diseased structure was seen to pass beneath the muscle, and to be so incorporated with it as to require the division of the muscle at this point, the middle third of it being left attached to the tumor.

The anterior and upper part being then separated from the side of the pharynx and larynx, it was found, after dissecting the tumor from the common carotid artery, opposite the thyroid and cricoid cartilages, that the deep jugular vein could not be safely detached. A second ligature was, therefore, applied to this vein about an inch below the angle of the lower jaw, and the vessel divided below it, leaving several inches of the vein in the tumor, after which the whole mass readily came away. More than twenty ligatures being applied to different arteries and veins, and the effects of the chloroform being allowed to pass off, the wound was closed by stitches, adhesive strips, lint, and a bandage. When the parts had sufficiently healed, care was also taken by resorting to bandages and position, to prevent the head becoming awry, and the patient recovered without inconvenience, notwithstanding the loss of the middle third of the mastoid muscle.

§ 2.—EXTIRPATION OF A LARGE MALIGNANT TUMOR OF THE LYMPHATIC GLANDS OF THE NECK.

OPERATION OF DR. JOHN C. WARREN, OF BOSTON.¹—In this case, the tumor had existed over a year; occupied the whole of the left side of the neck from the ear to the clavicle, and from the trachea to the spine; the mastoid muscle and all the arteries, veins, and

¹ Warren on Tumors, p. 175.

nerves of the neck being presumed to be included in its substance, whilst a process extended under the jaw into the pharynx, and filled the left half of this cavity with a red tumor which greatly impeded deglutition, the whole structure being very hard, knotted, uncolored, and insensible.

OPERATION.—In commencing the operation, the patient being of course fully etherized, an incision was made from behind the ear to the anterior third of the clavicle, the surface of the tumor uncovered, and the mastoid muscle sought for, but found to be partly absorbed and partly buried in the tumor. After clearing the latter from the ear, the jaw, larynx, and dorsal muscles, an attempt was made to get under the tumor just above the clavicle, and then the difficulties of the operation appeared, the carotid artery, internal jugular vein, and par vagum nerve being covered by it, and connected with processes of the mass in such a manner as to render it difficult to distinguish them. This being at last accomplished by breaking down the lower part of the tumor, the vein was found to be obliterated and the artery diminished in size, but pervious. A ligature being then applied on the latter, the par vagum nerve was separated as carefully as possible, though not wholly cleared of the tumor, and the separation of the latter from the nerves at the upper part of the neck next attempted and successfully accomplished, with the exception of the sublingual nerve, which so barred the access to the pharyngeal part of the tumor that it was determined to divide it. This being done, the operation was finished by breaking down such parts of the tumor as could not be separated from the other nerves, when the parts were brought together, and the patient put to bed, there being but little hemorrhage, a fact stated by Dr. Warren as common in large and hard tumors. The patient at first did well after the operation, but died about a year subsequently of an ulceration of the throat, which created a difficulty in swallowing.

A yet more complicated and severe operation was performed in another case by Dr. Warren.¹ "In this patient, the tumor extended from the spinous processes of the cervical vertebræ to the lower jaw, pharynx, œsophagus, and larynx, running upwards behind the ear and downwards to near the clavicle. This tumor, which had existed for thirty years, had turned the face to the opposite side, impeded the motions of the head and neck, and caused dizziness, headache, and dyspnœa. After examining and considering the case,

¹ Warren on Tumors, p. 177.

Dr. Warren was induced to think that the tumor had originated in the lymphatic glands behind the posterior edge of the sterno-cleido-mastoid muscle, had extended backwards under the trapezius to the spine, and forwards under the mastoid muscle to the pharynx; that it adhered to the splenius, complexus, and trachelo-mastoidicus muscles, and also involved the digastricus, as well as all the styloid muscles; that the external carotid artery, with all its branches, excepting possibly the superior thyroid, were involved; and that the jugular and smaller veins, together with the three or four superior cervical nerves, the par vagum, sublingual and its descending branch, the glosso-pharyngeal, laryngeal, and great sympathetic, were also connected with it.

After a full consultation and statement to the patient of the dangers of the operation, and the impracticability of disengaging the whole tumor, the propriety of submitting to it was left to the patient's decision, and the latter deciding to do so, the operation was performed at Lincoln, near Boston.

OPERATION OF DR. J. C. WARREN.—“The patient being seated in a chair with his head supported, an incision was made from the spine to the angle of the jaw, to meet another incision which was carried from this point downwards to near the clavicle in the direction of the anterior edge of the sterno-cleido-mastoid muscle. This flap of integuments being turned down after a laborious dissection, in consequence of its close adhesion to the tumor, the posterior half of the latter was exposed from the spine to near the trachea, showing the mastoid muscle firmly imbedded in the scirrhus mass. Having dissected the muscle from its inferior adhesions, the carotid artery was exposed and tied. The superior flap of the integuments being then raised, an attempt was made to disengage the mastoid muscle from the furrow it occupied in the upper portion of the tumor, in order to pursue the dissection beneath it; but this being found impossible, it remained either to divide the muscle and the accessory nerve, or to divide the tumor through its middle behind the muscle. The latter course being chosen, the mass was cloven in two, the posterior half dissected out, and the anterior then disengaged by great care from the posterior face of the sterno-mastoid and digastric muscles as well as from the nerves, bones, parotid, and sub-maxillary glands; but some portions remained adherent to the fore part of the bodies of the vertebræ and to their transverse processes, and could not be wholly dissected without exhausting the patient's

strength. The actual cautery was, therefore, applied to them without causing much complaint.

"In the latter part of the operation, the patient was occasionally seized with a spasmodic cough produced apparently by the division of some of the branches of the accessory nerve. The internal jugular vein, being buried in the tumor, was compressed between it and the clavicle, and then divided and tied, a few bubbles of air which entered the open mouth of the vessel being arrested and forced back again by a finger applied below the opening. The principal branches of the first and second cervical nerves were now seen and divided, and others in the substance of the tumor were also divided as indicated by the patient's sensations, although they were not seen.

"The integuments being then laid down on the face of the wound, and moderately secured so as to protect it without too much confining the parts destroyed by the cautery," the operation was completed, and the patient is believed to have recovered.

The details and symptoms after the operation, as well as the subsequent treatment, may be found in the valuable volume from which so much has now been quoted, that my limits prevent their being further referred to. Since it was written, Dr. Warren has availed himself so generally of the benefits of anæsthetics, that I feel no hesitation in urging their use in connection with all operations of a similar character, believing that he would do so at present. Operations of a similar character by Drs. Rodgers and Stevens, of New York, Hayward, of Boston, Gibson, of Philadelphia, Spencer, of Virginia, and Nathan R. Smith, of Baltimore, will be found referred to in the Bibliographical Index, pp. 89, 90.

REMARKS.—From the details furnished in the preceding accounts of the removal of a most dangerous class of tumors of the neck, a good idea can be obtained of the anatomical as well as operative skill requisite for their execution. In fact, no surgical operations require a nicer discrimination of structure than those arising from the removal of tumors in this region, muscles, nerves, arteries, and veins being all liable to be displaced and changed in character to a greater or less extent, yet, all requiring to be accurately recognized at each step of the dissection. But, though an operation for the removal of large tumors is important and highly dangerous, it does

not really deserve as much consideration and caution as those in which the disease is less developed. In a case of the magnitude of those above cited, danger is so evident that prudence and forethought are ready to contend with it, the presence of skilful assistants, together with all the adjuvants likely to prove serviceable, being naturally prepared by the operator.

The truly dangerous cases, in my estimation, are the small and apparently inconsiderable tumors of the neck, the removal of which seems to be so simple and easy that they might almost be designated as traps to catch the inexperienced and foolhardy, or those in whom boldness takes the place of discretion. The younger surgeon cannot, therefore, be too much upon his guard when consulted in reference to small tumors of the neck. In these cases, when he has decided to attempt their removal, let him always think that, before his operation is completed, he may be compelled to open the sheath of the vessels and ligate the carotid artery, and, with such a prospect before him, his operations will not only be well performed, but acquire a simplicity of character that will be mainly due to his thorough preparation for all the contingencies that may arise, in consequence of the difficulty of settling a question that can only be decided by his operation, to wit, the attachments of a tumor in the neck.

SECTION III.

BRONCHOCELE, OR GOITRE.

In the preceding section, the account of the operative proceedings requisite for extirpating tumors of the neck has been limited to such as are sanctioned by the highest authorities, and therefore presumed to be fit cases for such operations. There remain, however, a class yet to be described, the propriety of removing which is extremely doubtful, and seldom now thought of, except in cases where the patient's sufferings from suffocation are most urgent.

§ 1.—BRONCHOCELE, OR GOITRE.

PATHOLOGY.—Bronchocele (*βρογχος*, trachea, and *αγκλη*, a tumor), is a well-known disease, which consists in the enlargement of either

one or both lobes of the thyroid gland, though the same name has been occasionally applied to a degeneration of the surrounding cellular structure and lymphatic glands. According to Dr. John C. Warren,¹ "the thyroid gland is subject to two kinds of enlargement, one of a temporary nature, known as goitre; the other a permanent scirrhus."

True goitre exists at all periods of life, especially in the female sex, and consists in a chronic inflammation of the thyroid gland itself, which, beginning at some one point, is apt to extend until, as in a case related by Alibert, it reached to the thighs of the patient. The changes within a goitre vary with its development; presenting sometimes a soft gelatinous matter, or a more hardened structure interspersed with cysts containing a serous, glairy, or melicerous substance, and occasionally pus, fibrin, calcareous concretion, or pure blood.² Vascular derangement being here very evident, the thyroid arteries are commonly found to be much enlarged. In some cases, the swelling seems to consist almost entirely of a congeries of varicose veins, and, under these circumstances, there may be considerable sanguineous effusions, the blood being poured into the enlarged vesicles, or into the connecting cellular substance of the gland.³ Besides the hypertrophy of the parts consequent on chronic inflammation of this gland, the thyroid body is also sometimes the subject of scrofulous, lymphatic, or scirrhus degeneration.

In the Scrofulous Goitre, the cellular tissue enveloping the gland and prolonged throughout its structure is thick, compact, and resisting, so that each portion is transformed, as it were, into a cyst which is filled with a matter of varied color and consistence, though all the elements of the gland may yet be recognized.

In the Lymphatic Goitre, certain fluctuating points are readily recognized, the cysts being found to contain serous, albuminous, lactescent, or puriform matter, or the points which appear to fluctuate, consisting of a spongy structure analogous to that of the placenta.⁴

The Scirrhus Goitre presents a tumor covered by a firm fibrous capsule, and consists of a spongy texture, in which appears a consi-

¹ Warren on Tumors, p. 302.

² Pathological Anatomy, by Samuel D. Gross, p. 407.

³ *Opus citat.*

⁴ Dict. de Méd., tome xiv. p. 172.

derable number of cells, some of which are of large size, and contain a bloody fluid. Its consistence is often firm, but not scirrhus, except at the upper part, which sometimes has the texture, consistence, and white color of true scirrhus.¹

DIAGNOSIS.—The Goitrous tumor has a smooth surface, a somewhat elastic feel, follows all the motions of the larynx, especially in swallowing, and gives no sensation of erepitation, fluctuation, or pulsation.

Cysts of the thyroid region, unless enormously distended or multilocular, give the sensation of fluctuation. Tumors similar to these have been described by Maunoir as "Hydrocele of the Neck."

Scrofulous enlargement about the thyroid gland tends to suppuration, and the patient shows the marks of a scrofulous diathesis.

In Scirrhus, the tumor grows very slowly, is small, and its surface is hard, lobulated, or tuberculated; it is accompanied by pain, and is liable to ulceration. In Fungoid degeneration, there is the ordinary constitutional disturbance of the complaint, as seen elsewhere.

Owing to the position of the thyroid gland, it has occasionally happened that its proximity to the carotid artery has led the observer to regard it as an aneurism, a case of which has been published by Dr. Samuel Griffiths, of Philadelphia.² In this case, dissection alone revealed the disease. As a general rule, however, the pulsations of an aneurism give a motion to the whole tumor; and Boyer has facilitated the diagnosis of one from the other, by directing the relaxation of the muscles by inclining the head to one side, by which means the impulse will be checked, if it is a goitrous tumor.³

The propriety of operating on these tumors is a point on which most surgeons are very decided, the opinion being almost universal that any attempt to extirpate them is most hazardous. It is presumed, therefore, that any surgeon who may be called on to treat a case will first resort to every remedial measure, and especially to the use of iodine internally and externally for many months, before entertaining for a moment such an idea. To those who desire more detailed information of the pathology of this disease than is to be

¹ Warren on Tumors, p. 307.

² Eclectic Repertory, vol. ix. p. 120.

³ Dict. de Méd., tome xiv. p. 177.

found in most of the general works which treat of this tumor, I would recommend the articles in the volumes above quoted; an extended article by Dr. William Gibson, of Philadelphia,¹ reference to which has been accidentally omitted in the Bibliographical Index; and the memoir of Dr. Benjamin Smith Barton, of Philadelphia, published in 1800.

Although the extirpation of a goitre cannot be regarded as a justifiable operation in most instances, the distress of breathing and swallowing which it sometimes causes may render it imperative on the surgeon to attempt some means of affording relief; but even then local depletion, iodine, and similar means should be first fully tried before resorting to so dangerous an operation.

TREATMENT OF GOITRE.—In a tumor which has presented such varied pathological changes as those seen in this gland, and in which many points have not been described with the accuracy that might be desired, it is not surprising that various plans of treatment should have been recommended, in addition to the general remedial measures just spoken of, surgeons having at different periods advised the use of a seton, or of caustic, as well as the ligature of the whole tumor, or of a ligature upon the thyroid arteries, compression, and extirpation. That some of these means are better adapted to the mere cystic tumors of this region than to the cure of a true goitre, cannot be doubted, and such suggestions can therefore be regarded only as indicating the different views in relation to the condition of the diseased part held by those who have suggested them. Any operation upon a true goitre being usually deemed inadmissible, except as a last resort, I shall only refer to such means as have been employed in the United States, and of these the operation of compression will be first mentioned, as being that which may be most readily and safely tried.

§ 2.—TREATMENT OF GOITRE BY COMPRESSION.

OPERATION OF DR. WM. C. DWIGHT, OF NEW YORK.²—After preparing “three straps of good glazed brown cambric, spread with emp. ol. lini cum plumb. sem. vit. oxid. (diachylon), each of half the

¹ Philadelphia Journ. Med. and Phys. Sciences, vol. i. p. 44, 1820.

² Transact. Am. Med. Association, vol. iv. p. 248, 1851.

width of the tumor, and of a length sufficient to reach from the lower edge of the scapula of one side obliquely up the opposite side of the neck and across the lower part of the tumor, and passing thence around the neck and across the shoulder, down to the lower edge of the opposite scapula, he warms and applies them to the part in the line mentioned, so that each strap may cross behind the neck like suspenders. The first strap, being drawn quite tightly, produces very considerable turgescence of the bloodvessels of the face, and causes the patient to shrug his shoulders for a few minutes, until the thyroid vessels become sufficiently compressed to enable him to breathe more comfortably, when the countenance usually resumes its natural appearance, as is often the case in less than five minutes. The second strap being then passed in the same manner across the upper part of the tumor, or from half an inch to an inch from the first, according to the size of the tumor or length of the neck, this strap should also be drawn as tightly as the first, and the same time allowed for the change in the countenance, when the third strap being applied over the intermediate space, the operation is completed.

“Ordinarily, these plasters adhere to the part for ten days, or a fortnight, if the weather is cool, and, on becoming loose, ought to be removed, when, if the pressure has been well applied, the tumor will be found to have become slightly less, and the skin somewhat reddened and tender. When this is seen, it will be better to wait till the integuments assume their natural appearance, when the application may be renewed.

“The first application of these strips has, in one case, been sufficient to effect the cure, but the average repetition of them has been as high as four times in each case. When the bronchocele becomes diminished to half its size at the time of the first application, the tumor will continue to disappear without further care; Dr. Dwight, in twenty cases, having had no failure from this mode of treatment. The iodine had not succeeded with him in several instances. In two patients, the disease returned at the end of two years, but disappeared on a new application of the strips.”¹

¹ Buffalo Med. Journ., Jan. 1851.

§ 3.—LIGATURE OF ONE OF THE THYROID ARTERIES.

OPERATION OF DR. HORATIO G. JAMESON, OF BALTIMORE.¹—An incision, about an inch long, being made parallel with the trachea, and about midway between it and the inner edge of the sterno-mastoid muscle, and, having reached the thyroid artery by a very cautious dissection, so as to avoid dividing any considerable branch of the nerves, an animal ligature was applied to the vessel, and the wound allowed to heal over the ligature. Several months subsequently, the tumor, by actual measurement, was considerably less.

The ligature of all the thyroid arteries would only be a repetition of this operation, but would certainly increase the patient's danger, and require a perfect anatomical knowledge of the structures concerned. Four cases of cure from the use of the ligature have been recorded by European surgeons.

§ 4.—SUBCUTANEOUS LIGATURE OF GOITRE.

OPERATION OF BALLARD AND RIGAL DE GAILLAC.²—"The goitre being very large, was tied in three portions, each being strangled by a separate thread, as follows: Two long waxed ligatures, each armed with three needles, viz., one, *straight and cutting*, being applied at one end of the thread; the second, *round and pointed*, in the middle of the thread, to be drawn double across the tumor; and the third, armed at the other end of the thread with a *curved* needle, were each properly arranged. Then a vertical fold of the skin, being raised opposite the superior part of the tumor, was traversed by the straight needle at one end of the thread, and, the fold being let go, the ligature was made to describe a curve round the upper part of the tumor, so that an end hung out on each side of the goitre. Through the same punctures, but beneath the tumor, the round and pointed needle was then passed and directed from one side to the other, so as to draw with it the middle of the ligature, which, when passed, was removed by cutting across the loop, so that there was now a complete loop surrounding the superior third of the tumor at its base, with its two ends hanging out of one puncture, whilst the

¹ See Bibliography, p. 89.

² Malgaigne, Philad. edit., p. 378.

other thread, or that passed across and beneath the upper third, was destined for its middle portion. The second and third ligatures being then passed in like manner, it was only requisite to form round the middle third a complete and subcutaneous loop, which was effected by using the remaining curved needle, when all were tightened by a *serre-nœud*."

A reference to the diagram accompanying the account will render this operation easy of comprehension.

Febrile reaction followed, and on the fifth day a puncture with a lancet was necessary to give exit to a little pus and gas which had accumulated under the skin, but the patient was subsequently cured, with only a slight trace of the affection.

I. DISSECTION OF THE SKIN AND LIGATURE OF THE TUMOR.

OPERATION OF MAYOR.—The tumor being exposed by a double elliptical incision, which turned back the skin to the right and left, the base of the tumor was traversed by two ligatures, the two ends of the same ligature being tied so as to strangulate separately each half of the tumor.

A somewhat similar operation has been successfully performed by the late Mr. Liston, of London, and is represented in Plate XXXVII., Fig. 1.

EXTIRPATION OF A SCIRRHOUS THYROID GLAND, BY DR. J. C. WARREN, OF BOSTON.¹—The patient being in the upright position, an incision nearly four inches long was carried along the anterior edge of the sterno-mastoid muscle, so as to expose the platysma-myoides, which was incised so as to present the edge of the sterno-mastoid. On turning this aside, the sterno-hyoid and thyroid muscles were perceived to cover the tumor in such a way that it was necessary to separate them and dissect between them. The surface of the tumor, being then brought into view, was fully exposed by dissection, and separated from the sheath of the carotid artery by the handle of the knife. This apparently loosened its attachments, but a solid adhesion being found to the trachea for one or two inches, and also to the œsophagus for a small extent, which required the use of the knife, the dissection was pursued upwards and back-

¹ Warren on Tumors, p. 305.

wards, in order to extract the superior corner of the gland. The superior thyroid artery being divided in so deep a position as to prevent its ligation between the muscles, the common carotid was therefore tied. The inferior thyroid did not bleed, or was supposed not to exist, and the patient, after serious symptoms, recovered in about one month.

REMARKS.—Of the different operations just detailed, compression is certainly the safest, and, judging from the account furnished by Dr. Dwight, the most successful. Ligature of the thyroid arteries, although successful in a few cases, is so hazardous and difficult an operation that few will probably be disposed to attempt it; in addition to which, there would certainly be good reason to fear a return of the circulation through the numerous anastomosing branches. As the ligatures must also be placed near the origin of the thyroid arteries, there has not always been a sufficient amount of the vessel left to prevent secondary hemorrhage, a case being on record, where, from the proximity of the carotids, the loss of blood has been most alarming, nothing but compression by the fingers of assistants, during eight consecutive days, having rescued the patient.

Although I have placed among the preceding operations an account of the extirpation of the thyroid gland as performed by Dr. Warren, it has been done rather to complete the record than from a wish to lead any one to its repetition, even when sanctioned by such excellent authority. Though occasionally performed, an attempt to extirpate a goitrous tumor is so liable to cause immediate death from hemorrhage, that few, as before stated, deem the operation justifiable, more than one patient having died on the table. The ligature, both by the subcutaneous method and also after the exposure of the tumor, has succeeded, yet the obstruction of the circulation through the part by this method has also been followed by alarming symptoms of suffocation and congestion of the brain. Every surgeon, therefore, should avoid operating on any case of true goitre, unless fully prepared to encounter great difficulties, or with the view of relieving *certain* suffocation. In the operative treatment of this tumor, it may well be said that "discretion is the better part of valor."

SECTION IV.

HYDROCELE OF THE NECK.

PATHOLOGY.—The term Hydrocele (*υδωγ*, water, and *χηλις*, tumor), though generally limited to collections of fluid within the tunica vaginalis testis, has also been applied by Mr. Maunoir, of Geneva, to encysted tumors found in that portion of the neck near the thyroid gland, which are filled with liquid. These tumors are met with at various periods of life, in both sexes; their progress is slow, and they often arise without any appreciable cause from the cellular spaces of the thyroid gland, being occasionally congenital. Though seldom larger than a walnut, they may acquire the size of an orange, and impede respiration and deglutition. Their contents vary from a thin serum or oily liquid to a thicker consistence, the cyst itself varying in thickness from the fourth of a line to a quarter of an inch or more. The skin covering the tumor seldom undergoes any change except when attenuated by the size of the tumor, when the subcutaneous veins may become apparent. The tumor is free from pain or tenderness on pressure, fluctuates slightly, and, if seated over an artery, might be mistaken for an aneurism, or, if over the thyroid gland, be supposed to be a goitre.¹

OPERATION.—These cysts may be treated on the same principles with those seen elsewhere, that is, evacuated by a simple puncture, or with a trocar, or cured by exciting inflammation within the cyst itself by means of a seton, or by acupuncture, or by injecting iodine, or wine and water, or a solution of sulphate of zinc, or by excising the cyst, or by incision and tents, as proposed by Porta, of Padua, and accomplished by Dr. Pancoast, of Philadelphia.²

The selection of any of these plans of treatment will depend somewhat on the patient's constitution and circumstances. The use of the seton has led to such irritation as to induce death. Erysipelas is apt to follow the injection of iodine or other stimulating liquids, and the excision of the cyst, like any operations upon an enlarged thyroid gland, exposes the patient to the risks of severe hemorrhage if the proper structure of the gland is invaded. All these plans of

¹ Liston's Surgery, by S. D. Gross, M. D., Louisville, p. 386.

² See Bibliography, p. 91.

treatment have, however, sometimes succeeded, and, when the surgeon is aware of the risk attending them, under certain circumstances, the selection of either plan may justly be left to the decision of the moment. As illustrative of the treatment by excision, I quote the following operation:—

OPERATION OF DR. J. PANCOAST, OF PHILADELPHIA.¹—A vertical cut being made through the skin, over the longitudinal axis of the tumor, the fascia and platysma-myodes muscle (which was very red, thick, and vascular) was divided upon a director. The tumor, thus exposed, was blue or livid from the coagulated blood which filled it. The cellular tissue over the top of the gland being now opened, the superior thyroid artery was drawn out by a blunt strabismus hook and tied. A strong pulsating branch on the outer edge of the gland, which came from the inferior thyroid, was also isolated and tied; after which the cyst was seized with the forceps, and separated from the body of the gland with the handle of a scalpel, its attachments being feeble. The tumor being detached, a little arterial bleeding followed from the bottom of the deep cavity left in the gland, but this was arrested by ligature, the whole operation causing the loss of but little blood. The wound was lightly dressed, some suppuration followed, and in three weeks cicatrization was complete. Dr. Pancoast regards this as the only instance of a similar dissection made in this country, though Prof. Porta has done it repeatedly. It is, however, an operation requiring a good amount of anatomical knowledge, as well as practical skill in operating.

REMARKS.—From the resemblance of these tumors to those seen in other regions, they are generally regarded as belonging to the encysted class; and the application to them of the term “Hydrocele of the Neck” is, therefore, liable to lead to error. In the opinion of Percy, those found over the thyroid gland were simply “softened bronchocele.” I have seen these tumors twice in this position, and once over the parotid gland, in both of which they were nearly of the size of an orange. The fluctuation being evident, puncture and the introduction of a seton accomplished the cure.

¹ Medical Examiner, vol. vii. N. S. p. 504, 1851.

CHAPTER VII.

ANEURISMS IN GENERAL.

THE term Aneurism (*aneurysm*, to dilate) has long been employed to designate such tumors as were caused by dilatation, or rupture of the coats of an artery, in consequence of which the patient was sooner or later liable to sudden death by hemorrhage, from the giving way of the sac, or diseased portion of the vessel.

The plans of treatment proposed for the relief of this state of the vessels have been very varied, most of them being based on the idea of arresting the flow of blood through the weakened portion of the artery. In addition to the employment of such constitutional means as would prevent the too great distension of the sac by diminishing the force of the circulation in these tumors, we therefore find that they have also been cured by obstructing the course of the blood through the artery by means of the ligature, so as to compel it to pass by collateral branches until it could again enter the main trunk beyond the seat of the disorder; or by retarding the flow of the blood by external pressure until its more fibrinous portion was deposited in and about the sac on the weakened side, so as to enable these parts to sustain the force of the current as it passed through the main channel of the artery. Without entering into the details of the various kinds of aneurism, as well as the modifications of treatment suggested and practised at different periods, it must suffice at present to show the diagnostic signs of the complaint, and the different operations applicable to its relief.

SECTION I.

DIAGNOSIS OF ANEURISM IN GENERAL.

When an aneurism has occurred in an artery which is so situated as to permit the use of the sense of sight, and the expansion of the vessel has not attained any very great size, there may often be noticed, when pressure is made upon or near the usual course of the vessel, a round or ovoid tumor. This tumor gives to the fingers

the sensation of elasticity, disappears more or less under pressure, reappears when the force is removed, softens and diminishes when the main trunk is compressed between the tumor and the heart, and may be felt pulsating synchronously with each contraction of the ventricles. The skin over this tumor will at first preserve its natural appearance, but in the progress of the disease it will present us with signs of venous congestion, then of inflammation, and lastly, of ulceration or sphacelus. Most frequently this tumor increases slowly, and without much pain, though sometimes the latter is very acute, especially if a sentient nerve is put upon the stretch, or compressed by the development of the complaint. When the tumor has existed some time, it becomes more and more firm in consequence of the fibrinous deposit going on in its interior, or from the formation of clots. In consequence of these changes, the pulsations in it, which were before plainly perceptible, now become less distinct, so that in some cases it may be necessary to resort to the aid furnished by auscultation, either by applying the ear directly to the tumor, or, where it is wished to circumscribe the part that is to be examined, by employing the stethoscope. On ausculting the tumor, in either of these methods, the surgeon will hear either a sawing or bellows sound, or the peculiar noise which has been designated as that produced by rapidly pronouncing the letter r, creating a "whirring sound."

Apparent pulsation in the part is, however, liable to lead to grave errors. If, as has been before stated, a solid or firm tumor should be seated over the course of an artery, and be bound down to it by fibrinous or muscular expansions, pulsation may apparently be perceived in the tumor, and yet be caused solely by the proximity of the vessels; but if such a tumor be drawn to one side, or the muscles be relaxed by change of position, then the pulsation will cease, which is not the case in aneurisms. The diagnosis in these cases is, however, often one of great difficulty, and many instances have been recorded where the most experienced surgeons have been mistaken. Several years since, I saw in the Blockley Hospital, Philadelphia, a large abscess in the iliac region pulsate so as to simulate an aneurism, and the difficulty of diagnosing it was so great that an eminent surgeon spoke of it as a decided example of vascular enlargement.

In all cases of doubt, palliative measures alone should be resorted to until the character of the complaint can be more positively established. But if delay does not elucidate the case, and the pain and

other urgent symptoms require a prompt decision, the practice of Guattani may be repeated, and an exploratory puncture made, the hemorrhage, if it be an aneurism, being arrested by pressure. The opening of the aneurismal sac, under these circumstances, has not, however, been attended by the serious results that might at first be anticipated. Several instances of its having been done, in a more extensive manner, without causing serious difficulty, have been mentioned by surgical writers, among which is one by Dr. John Rhea Barton, of Philadelphia,¹ where an empiric plunged a lancet into the tumor, under the supposition that the disease was an abscess. Fainting arresting the hemorrhage at the time, the patient lived six weeks, and afterwards died of mortification of the limb; when, on a *post-mortem* examination, the inguinal tumor and femoral artery were found in such a condition that Dr. Barton expressed the opinion "that, if the patient (aged seventy years) had had a little more vigor of constitution, the opening of the aneurismal tumor would have cured the complaint." Lest, however, such fortunate results should not always ensue, it will be safer for the surgeon, when compelled thus to test the character of the tumor, to be prepared to ligate the main trunk of the artery immediately.

SECTION II.

TREATMENT OF ANEURISM WITHOUT AN OPERATION.

In cases where the diagnosis of an aneurismal tumor is difficult, or in any case where circumstances render it desirable to delay the more certain method of curing the complaint, *e. g.* by the application of a ligature, the surgeon may find it desirable to try the effects of the constitutional plan of treatment suggested and practised by Valsalva, or to employ compression, as suggested by Guattani, in Italy, in 1757, and employed by Sir Wm. Blizard, of England, in 1802; by Drs. Physick and Parrish, of Philadelphia², in 1811, and by Bushe, of New York, in 1826. The method of treating aneurism by gradual compression of the vessel between the tumor and the heart, has also been recently (1842) brought to the notice of the profession by Dr. Hutton, of Dublin, and carried yet further (in 1843), by Dr. Bellingham, of the same city.

¹ Philad. Journ. of Med. and Phys. Sciences, vol. i. N. S. p. 127.

² Eclect. Repert., vol. i. p. 506.

§ 1.—PLAN OF VALSALVA.

Valsalva proposed the following plan for the cure of large internal aneurisms, and in some few cases it has been attended with much benefit. After bleeding the patient very freely, he gradually diminished the quantity of the food, until the patient was reduced to so feeble a condition that he could hardly get out of bed, when the diet was gradually increased until this extreme debility passed away.

REMARKS.—In cases of large aneurismal tumors, the benefits derived from the plan of Valsalva have been very great; an autopsy, in one case, showing that the dilated artery had become contracted and callous under this treatment. But, though very plausible, this plan has not been followed by the general success that might have been anticipated, and Boyer, Sir A. Cooper, Roux, and many other surgeons, incline, therefore, to the opinion that the quickening of the pulse, which is the result of his method, often does as much injury to the tumor as the natural force of the circulation.¹

§ 2.—TREATMENT BY COMPRESSION.

The relief of an aneurism by means of external pressure applied so as to check the current of blood passing through an artery, seems to be one of those natural suggestions that must have presented itself, at an early period, to the mind of every surgeon. We find, however, that it was not until 1765, that Guattani succeeded in curing an aneurism of the femoral artery by these means, pressure having been applied upon the centre of the tumor, through two compresses in the form of the letter X, and another compress placed over the entire course of the artery, the whole being confined by a bandage, whilst Valsalva's plan of treatment was persevered in to a certain extent. In 1802, Mr. Blizard, of England, employed compression by means of a circular tourniquet applied so as to preserve constant pressure, but the patient not being able to endure it, his artery was subsequently tied by Sir A. Cooper.² In 1810, after noticing the *spontaneous* cure of an aneurism of the femoral artery, in which, however, pressure by means of a bandage to the limb had been once employed, Dr. Physick, of Philadelphia, suggested the following method of applying gradual pressure:—

¹ Cooper's Lectures, vol. ii.

² Chelius, vol. ii. p. 483.

PHYSICK'S METHOD.¹—Apply to the diseased region, a truss-like pad, so arranged as to preserve very gradual pressure on the femoral artery near the groin, having it so fastened with a screw that a half turn of the screw may be made every day until the requisite amount of compression is effected. By applying the pressure in this gradual manner, Dr. Physick thought that the patient would be able to bear it without difficulty, and that the anastomosing vessels would have time to enlarge, and thus carry on the circulation through the limb.

COMPRESSION AS PRACTISED BY DR. BELLINGHAM, OF DUBLIN.—The patient having been kept at rest, and occasionally depleted for a week or ten days, two or more compressors, such as are represented in Plate III., Fig. 2, are to be kept at hand, so that as the pressure of one becomes painful, another may be applied at some new point between the heart and the tumor, whilst the first is removed; or, both being applied on the upper portion of the vessel, one may be alternately tightened and slackened, as the feelings of the patient may direct.

REMARKS.—In attempting the cure of an aneurism by means of compression, it is important to remember that during the entire course of treatment the limb should be kept in the horizontal position, and neatly bandaged from the extremity upwards, so as to guard against œdema or inflammation of the skin. It is also essential to success that the pressure should be applied *very gradually*, as it is sufficient to *moderate the circulation without obstructing it*. Unless thus conducted, compression will not only fail to cure the complaint, but also be likely to induce sloughing of the parts at the seat of pressure, or even gangrene of the limb. When judiciously employed, this treatment has often been followed by the most favorable results, having checked all pulsation in a tumor in ten days, though it usually requires a much longer time, amounting sometimes to six weeks. The success of compression, especially in the treatment of femoral and popliteal aneurism has been decidedly great. In the paper on statistics, &c., by Dr. Geo. W. Norris, of Philadelphia,² it is shown that out of thirty-seven cases thus treated, thirty-five were cured, one dying of disease of the heart and one being ligated; whilst in two hundred and four cases treated by the ligature (Hunterian method), fifty died, and six were compelled to

¹ Eclect. Repert., vol. i. p. 510.

² Am. Journ. Med. Sciences, vol. xviii. N.S. p. 324.

submit to amputation of the limb. In one case of popliteal aneurism, in my own practice, I succeeded in accomplishing a cure in twenty-two days, and in a recent case of varicose aneurism at the bend of the arm, where the tumor was nearly as large as an egg, obtained a cure in four weeks. In the latter case, the pressure was applied over the tumor, as well as in the course of the artery above the bend of the arm. A reference to the Bibliographical Index, page 141, will exhibit some of the cases cured by pressure, as applied by Drs. I. Parrish, of Philadelphia; Heustis, of Alabama; Jameson, of Baltimore; Bushe, Church, Wood, and Van Buren, of New York, and Bennet, of Connecticut.

§ 3.—APPLICATION OF GALVANISM BY MEANS OF ACUPUNCTURE
NEEDLES INTRODUCED INTO THE SAC.

The idea of inducing a fibrinous deposit within the sac by means of galvanism, as suggested by Mr. Phillips, of England, in 1832, may be carried out as follows: Two acupuncture needles, varnished, so as to prevent their rusting, being introduced obliquely into the sac, on opposite sides, so that their points may touch, whilst the circulation in the vessel is diminished by pressure upon the artery above the tumor, pass a galvanic current through the needles as strongly as the patient can bear, and continue it for a few minutes, or repeat it occasionally. Caution, however, is necessary, lest such an amount of inflammation be induced as will result in suppuration or gangrene, rather than in the formation of such a number of filaments in the blood as will serve for a meshwork for the subsequent formation of a coagulum.¹

REMARKS.—The treatment of aneurism by compression has, in addition to other advantages, the marked one of permitting the application of a ligature to the main trunk in such cases as resist these plans of treatment.

The plan of Valsalva is chiefly useful in hopeless cases, as those of the aorta, whilst acupuncturation is of very doubtful utility, having failed in 21 out of 32 cases operated on in Europe.

The injection of the perchloride of iron, as recently suggested in France, is also a very dangerous operation, and has resulted in death.

¹ Miller's Principles, Philad. edit. p. 551, 1852.

SECTION III.

GENERAL PRINCIPLES TO BE OBSERVED IN THE LIGATURE OF ARTERIES.

The accumulated experience of the profession in the application of the ligature to an artery having established certain general rules, as essential to the proper performance of the operation (although some few surgeons have modified them, or substituted others, either to meet particular difficulties, or because they were more in accordance with their individual experience), it will be found useful to follow them in the application of every ligature. As the object to be attained in ligating a vessel is a direct change in the course of the natural circulation, these rules may be condensed into two general ones, and on these all surgeons, it is believed, agree, to wit: 1st, always to expose the vessel without opening it; and 2d, to ligate it with as little disturbance as possible of surrounding parts. These general principles have been carried out in various ways; but as the views of Lisfranc in relation to the details, are not only the soundest, but also tested by personal experience, I shall adopt them as those most likely to prove useful to the young operator.

In ligating any artery, Lisfranc advises the surgeon—

1st. To expose the vessel without opening it, and in order that he may do so, suggests the following method of proceeding:—

a. To make sure of the position of the vessel.

Special anatomy, as usually taught, presents every medical man with accurate information in regard to the ordinary position of the arteries; but, as these vessels are liable to various anomalies, and to irregular distribution as well as to the changes consequent upon disease, special attention should be given to the position of the vessel upon each patient at the time of the operation.

b. To find the artery.

In seeking the vessel, notice should be first taken of the position of such muscles as usually indicate the course of the artery, or of those which have been termed "muscles of reference," so that by causing these muscles to contract and become prominent, the surgeon may readily recognize any deviation of the artery from its natural relations with these parts; or he may feel for the pulsation of the artery; or, if the tissues are too much thickened, or the vessel

lies too deep to admit of this, lines may be drawn from such fixed points of the skeleton as normal anatomy teaches us will cross or follow the usual course of the artery.

2d. To ligate it with as little disturbance as possible.

After recognizing the position of the vessel, its exposure becomes the next point for consideration, and, in order to prevent any variation from the proper line of incision, as well as to fix the skin, Lisfranc advises the operator to bring the four fingers of his left hand to the same level, and then, placing them perpendicularly on the skin, to be careful not to draw the latter to one side, whilst he incises the integuments by drawing the scalpel close along the edges of the nails. Malgaigne, however, objects to this direction as being likely to displace the integuments over the vessel, though my own experience is favorable to it.

When the artery is superficial, the incision through the integuments should be parallel to its course; but, when it is deep-seated, an oblique incision, by affording a greater line for any variation, will add much to the facility with which the vessel may be found. When the aponeurosis of the part is directly in contact with the sheath of the vessels, it is generally safer to open it on one side and then slit it up upon a director. On reaching the sheath of an artery, or the artery itself, the vessel may generally be told by its yellow or dull-white color, by its pulsation, and by its becoming flattened and collapsed when the circulation is interrupted between it and the heart.

In order to isolate the artery with as little disturbance as possible of surrounding parts, the relative position of the adjacent veins and nerves should be recollected, and the adhesions of the sheath and other tissues only loosened sufficiently to permit the passage of the ligature. To do this, it is important that a good needle be selected, that is, one which is neither so sharp as to expose the vessels to perforation, nor so thick and dull as to render it difficult to pass its point through the cellular tissue of the part. When, in passing the needle around the vessel, the point appears beneath any dense cellular structure, the latter should be supported by the pressure of a finger in order to facilitate its perforation by the instrument.

Another rule, which is an excellent one, and which Malgaigne¹

¹ Operat. Surg., Philad. edit. p. 140.

PLATE XXXV.

INSTRUMENTS EMPLOYED IN THE LIGATURE OF ARTERIES; WRY NECK;
CEDEMA OF THE GLOTTIS, AND HERNIA.

Fig. 1. Parrish's knife for dissecting about the sheath of arteries.

Rorer's pattern.

Fig. 2. The Philadelphia aneurism needle, employed by Drs. Parrish, Hewson, and Hartshorne.

Rorer's pattern.

Fig. 3. Another form of this needle. Each needle has two eyes, and the ligature is passed through the one nearest the handle.

Rorer's pattern.

Fig. 4. Another needle, very much curved.

Rorer's pattern.

Fig. 5. Blunt points, adapted to a common shaft, and intended to be detached in order to pass the ligature around the artery.

Rorer's pattern.

Fig. 6. Sharp points, intended to be similarly attached and detached.

Rorer's pattern.

Figs. 7, 8. Needles of other curves and lengths, adapted to deep arteries in confined points.

Rorer's pattern.

Fig. 9. A hook to be inserted into the eyes near the points of Figs. 5 and 6, when unscrewed from the shaft, in order to draw them around the vessel.

Rorer's pattern.

Figs. 10, 10. Knot-tiers, to tighten deep-seated ligatures. " "

NOTE.—The above set comprise the instruments included in the operating case of the late Dr. Jos. Parrish, for the use of which I am indebted to the politeness of Dr. Isaac Parrish. The full account of the investigations of Drs. Parrish, Hewson, and Hartshorne may be seen in the *Eclectic Repertory*, vol. iii. p. 229, 1813.

Fig. 11. Horner's aneurism needle.

Schiveley's pattern.

Fig. 12. Gibson's aneurism needle. A watch-spring is passed beneath the vessel, and the ligature being attached is thus drawn round it.

Schiveley's pattern.

Fig. 13. Tenotome or knife adapted to the section of the sterno-cleido-mastoid muscle.

Schiveley's pattern.

Fig. 14. Apparatus to bring the head into position in cases of wry neck, especially after the division of the muscle.

Rorer's pattern.

Fig. 15. Gurdon Buck's knife for scarifying the glottis in cases of œdema.

After Buck.

Fig. 16. Curved scissors for the same object.

" "

Fig. 17. Enterotome of Dupuytren.

Charriere's pattern.

Fig. 18. Blandin's enterotome.

" "

Fig. 19. Cooper's Hernia bistoury.

Schiveley's pattern.

Fig. 20. Small, blunt-pointed Hernia bistoury.

" "

Fig. 21. Straight-pointed Hernia bistoury.

" "



has designated as "the rule of the guiding points," is the following:—

"Do not, at the commencement of the operation, occupy yourself with looking for the artery, but seek the first marked point of reference, then the second, then the third, if there be one, and so on to the vessel."

Dr. Mott, of New York, whose experience in ligating the large arteries has probably been greater than that of any other surgeon in the United States, advises¹ that in every operation upon these vessels, but little use should be made of the scalpel after the edge of the muscle of reference is laid bare, the fingers, director, or handle of the knife being capable of separating these parts quite as readily as its edge, without at the same time exposing the surgeon to the troublesome oozing which is apt to ensue on the division of the minute vessels. By pursuing this plan, the main artery can also be more distinctly seen.

The late Dr. Joseph Parrish, of Philadelphia, in connection with Drs. Joseph Hartshorne and Thomas Hewson, also of Philadelphia, was accustomed to employ a knife which was rounded at the end (Plate XXXV., Fig. 1), for the purpose of dissecting about the sheath of the vessel.²

In order to hold the parts asunder, Dr. Mott employs curved spatulæ (Plate II., Fig. 10), and divides the sheath of the vessels perpendicularly, and only upon the front of the artery, never dissecting or using the blade on the sides of the vessel, but introducing the knife-handle, and separating the structure on each side, so as to denude the artery only to such an extent as will permit the aneurismal needle to pass. He has generally employed the Philadelphia needle (Parrish, Hewson, and Hartshorne, Plate XXXV., Fig. 2), and always introduces it so that its point will pass from the vein, and not to it. This last rule is equally applicable to the introduction of any instrument which is intended to pass a ligature around an artery.

In attempting the cure of aneurisms by the application of the ligature, surgeons now generally resort to the method of Hunter, in which the ligature is applied to the sound coats of the vessel at some little distance above or on the cardiac side of the tumor, that

¹ Mott's Velpeau, vol. i. p. 301.

² Eclectic Repertory, vol. iii. p. 229, 1813.

of Brasdor, in which it was ligated on the distal side of the tumor, being seldom employed. The latter operation is also applicable only to cases in which no branch comes off from the artery between the ligature and the sac (as is often the case), or in those where there is no branch communicating with the sac itself, which is also often met with. It is, however, especially applicable to aneurisms so seated as not to leave sufficient space between the tumor and the main trunk of the artery for the application of the Hunterian plan, *e. g.* as in aneurism at or near the innominata, or at the root of the right subclavian; in these cases, Brasdor's operation is very useful. In other cases, and they are by far the most numerous, the application of the ligature can be most advantageously made by the plan proposed by Hunter, that is, its application on the sound artery between the tumor and the heart. This operation is, therefore, that which will be hereafter followed in the description given of the treatment of aneurisms by the ligature, except in the cases above mentioned of their development at the root of the subclavian, or in the innominata arteries.

CHAPTER VIII.

ANEURISM OF THE CAROTID ARTERIES.

SECTION I.

ANATOMY OF THE BLOODVESSELS OF THE NECK.

THE great points of reference in ligating the arteries of any portion of the body are, as has been stated, the course of the muscles of the part, after which the operator may seek for the adjacent bony prominences, or be guided by the position of the nerves of the part. In the arteries of the neck, such points may be readily found, and a brief reference to the normal anatomical relations of each of them will, therefore, prove sufficient for the general rules of operating upon these vessels.

The Common Carotid Artery, arising from the innominata on the right side, about the level of the top of the sternum, and from the

arch of the aorta on the left about one inch and a quarter below the top of this bone, ascends the neck on the outer side of the trachea and larynx as far as the inferior cornu of the os hyoides in the male, though a little lower in the female. In the lower part of the neck, the right artery inclines more outwardly than the left, the latter ascending almost vertically.

In this course, each artery, together with the internal jugular vein and par vagum nerve of each side, is inclosed in a firm sheath, which is connected with the fascia of the neck, the vein being on the external side of the artery, and swelling in front and above it, whilst the nerve is situated between the two vessels or a little behind them.

Directly above the sternum and clavicle, the vessels and nerve, arranged as just described, are covered by the sterno-hyoid and thyroid muscles, as well as by the sternal origin of the sterno-cleido-mastoid. On a line with the lower part of the thyroid cartilage, the artery is crossed obliquely by a ribbon-like muscle, the omo-hyoid. Behind the vessels and outside of their sheath may be felt the transverse processes of the cervical vertebræ, covered by the longus colli muscles, and upon these muscles, but exteriorly to the course of the vessels, as well as behind them, is the great sympathetic nerve. Along-side of the larynx, the carotid artery is very superficial, being covered only by the skin, superficial fascia, and platysma-myodes, though it is here also crossed by the omo-hyoid muscle. Having reached the space between the os hyoides and the larynx, the common carotid divides into the internal and external carotids, the latter being generally the smallest in children. No branches come off from the common carotid in the normal condition of the parts, though occasionally the inferior thyroid or the inferior pharyngeal arteries may be in the way of any incisions upon the main trunk, at the upper part of the neck.

The Internal Carotid in the adult is smaller than the external, and extends from the level of the larynx to the brain, being between the external carotid and the vertebræ of the neck, in front of the internal jugular vein, and having the par vagum nerve at its external margin. Near the base of the lower jaw, it is crossed externally by the digastric and stylo-hyoid muscles, and is immediately afterwards concealed by the ramus of the jaw.¹

¹ Horner's Anatomy.

"The External Carotid extends from the termination of the primitive carotid to the neck of the lower jaw. In the early part of its course, it is in front of the internal carotid and between the pharynx and sterno-mastoid muscle, where it is only covered by the skin, superficial fascia, platysma-myodes, and its own sheath. Just above this, it is crossed internally by the hypoglossal nerve, which sends off the Descendens Noni branch, the latter nerve being found upon the sheath as far as below the omo-hyoid muscle. Somewhat above this nerve, the artery is crossed by the digastric and stylo-hyoid muscles, and lies on the superior constrictor muscle of the pharynx near the tonsil gland. About its middle, it is crossed internally by the stylo-glossus and stylo-pharyngeus muscle, and then ascends through the substance of the parotid gland to the neck of the jaw, where it gives off the internal maxillary and temporal arteries."

"The Superior Thyroid Artery arises from the external carotid about a line from its root, and the Lingual comes off about six to twelve lines above this."¹ The anastomosis between the arteries of the two sides, through all their branches, is also exceedingly free.

The course of the artery, from its origin to the level of the os hyoides, may be designated by a line drawn from the mastoid process to the inner edge of the clavicle, or by the course of the sterno-mastoid muscle, when it can be recognized.

SECTION II.

LIGATURE OF THE CAROTID ARTERIES.

The ordinary position of an aneurismal tumor of the arteries in the neck, rendering it a difficult matter to keep up a steady pressure upon the main trunk, without also exposing the patient to the dangers of congestion of the brain from the proximity of the jugular vein to the artery, has prevented any attempts to cure these aneurisms by compression from being generally resorted to. The ligature has therefore been employed, whenever direct surgical interference was demanded.

The object of the applications of all ligatures to the carotid being the same, to wit, to cut off the circulation through the main trunk

¹ Horner's Anatomy, vol. ii. p. 207.

of the vessel, it is unnecessary now to mention the complaints which, in addition to aneurisms, may call for this operation, further than to say that wounds, and erectile or other tumors, constitute the greater number. Some of the various instruments employed for passing the ligature around arteries may be seen by referring to Plate XXXV., and are of course applicable to the carotid, as well as elsewhere. But to a dexterous operator, the selection of an aneurismal needle will prove a matter of but little moment, and any of them may therefore be taken, the choice being guided mainly by individual predilection.

HISTORY OF THE LIGATURE OF THE CAROTID ARTERY.—In the various accounts furnished by surgical writers of the history of the ligature of the primitive carotid artery, it is generally stated that the first application of it, as an operation, was made by Sir Astley Cooper, in November, 1805,¹ the ligating of the vessel by Heberstreit and Abernethy having been consequent on wounds of the throat. It is, however, well known in the United States that two years prior to the operation of Sir Astley Cooper, this important vessel had been effectually ligated by Dr. Mason F. Cogswell, of Hartford, Connecticut, who, in November, 1803, tied the carotid during the removal of a scirrhus tumor of the neck.² In this case, "the ligature separated from the artery on the 14th, and the patient did well until the 20th, when he sunk in consequence of a slight hemorrhage from a small vessel near the angle of the jaw, acting on a system enfeebled by a long-standing disease." It may interest the American student to know that this distinguished surgeon graduated at Yale College, in 1780, and served in the United States army, during part of the Revolution, with his brother, Dr. James Cogswell, commencing the civil practice of his profession in Hartford, in 1789. He died in 1830, in the 70th year of his age.³ Since the first four cases of ligature of this vessel, *e. g.* by Abernethy, for wound from the horn of a cow in 1799; by Heberstreit, 1800, for the extirpation of a scirrhus tumor; by Cogswell, of Connecticut, for a tumor, in November, 1803, and by Fleming in the same year, in a case of suicide, it has also been tied successfully by Travers, in 1804, for an aneurism in the orbit of the eye; by Sir A. Cooper, in 1805, for aneurism, the woman dying on the 19th day; and since then by

¹ Velpeau, *Op. Surg.*, Am. edit. vol. ii. p. 236.

² Williams's *Am. Med. Biog.*, p. 103.

³ *Ibid.*, p. 109.

very many surgeons in all sections of the globe. In the United States, the ligature of this artery was successfully performed for aneurism, by Dr. Wright Post, of New York, in 1817; by Dr. Mussey, of New Hampshire, successfully, in 1822, and by Dr. Sykes, of Delaware, successfully, in 1823. The ligature has also been placed upon both the arotids by Dr. McGill, of Maryland, in 1825, successfully; by Dr. Mussey, of New Hampshire, at two days' interval, in 1829; by Dr. Mott, of New York, unsuccessfully, in 1834, both vessels being tied simultaneously; and by Dr. J. Mason Warren, on both vessels successfully (at an interval of five weeks) in 1846. Reference to the Bibliographical Index, p. 91, will also show that the single ligature has been very frequently practised by other American surgeons, whose names are there given. Of these, few have been so frequently called on to perform it as Dr. Mott, of New York, he having, as I am recently informed, ligated the carotid artery for the thirty-second time.

§ 1.—LIGATURE OF THE PRIMITIVE CAROTID.

OPERATION AS PRACTISED BY DR. MOTT, OF NEW YORK¹.—The skin, superficial fascia, and platysma-myodes muscle being cautiously divided on the inner edge of the sterno-cleido-mastoid muscle, on a level with the larynx, separate the edges of the wound with the fingers, and push the omo-hyoid muscle downwards. Then carefully picking up the deep fascia in the forceps, nick it, and opening it on a director, seek for the descendens noni nerve, where it lies upon the sheath of the vessel, and pushing it to one side, cautiously open the sheath of the artery, and pass the ligature around it by means of the Philadelphia needle (Plate XXXV., Fig. 2), which Dr. Mott prefers to all others. Any small vessels that may bleed during the incisions, should be promptly tied in order to prevent the blood from obscuring the parts around the main artery.

OPERATION OF VELPEAU.—The plan recommended by Velpeau,² and by him designated as the ordinary operation, from its being pursued by nearly every surgeon, when circumstances admit it, is substantially as follows:—

OPERATION.—The patient being placed upon the back, with the

¹ New York Register of Med. and Pharmacy, vol. i. p. 93.

² Méd. Opératoire, tome i. p. 240.

chest slightly raised, the neck a little stretched, and the face inclined to the side which is opposite to the tumor, the surgeon should stand on the side of the aneurism, and feel for the anterior edge of the sterno-mastoid muscle, or for the depression which shows its border. Then placing upon it (as directed by Lisfranc), the four fingers of his left hand, all brought to the same level, let him make in this direction an incision about three inches in length, commencing on a line with the cricoid cartilage, and terminating near the sternum, if he desire to tie the artery in the omo-tracheal triangle, that is, below the omo-hyoid muscle. But if the disease permits the artery to be tied in the omo-hyoid triangle (above the muscle), the incision should be carried a little higher up and not so low down. A second cut of the scalpel should then divide the platysma-myodes muscle and superficial fascia, and lay bare the fibres of the sterno-mastoid muscle, when an assistant may draw the inner edge of the wound towards the trachea, and the operator push its external edge outwards by means of the first and second fingers of his left hand. The patient's head being then turned so as to relieve the extension and inclination of the neck, and relax the parts, the fibro-cellular layer, which extends from the sterno-hyoid and thyroid muscles to the posterior surface of the sterno-mastoid (layer of deep cervical fascia), should be divided by raising and nicking in it a little opening, through which a director may be passed.

The omo-hyoid muscle, being now seen as a reddish ribbon, may be divided upon the director, if it should be in the way of the operator, though generally this may be avoided by drawing it to one side. Above and below the line of the muscle will now be seen the yellow-looking sheath of the vessels, on the anterior surface of which is the descendens noni nerve. The sheath being then picked up in the forceps over the artery (not over the vein), and slightly nicked, the director should be introduced and the sheath opened upon it to the extent of an inch. If the jugular vein swells up in expiration, so as to embarrass the operator, it should be compressed, as advised by Mr. Hodgson, near the superior angle of the wound, when it will soon empty itself and shrink.

When the sheath is opened, the artery, par vagum, and vein, in the order mentioned, counting from the trachea, will be exposed; when the aneurismal needle should be introduced between the vein and artery, so as to keep its point close to the artery, in order to avoid the par vagum nerve, and being, by a slight rocking motion,

made to pass round the vessel, its point should be made to perforate any cellular tissue that opposes its exit, by the pressure of the fingers of the left hand.

After the ligature is withdrawn, the artery may then be very slightly raised upon it, and tied by a double knot, both ends being left attached in order to favor the escape of any suppuration that may subsequently supervene. The wound should next be lightly dressed, and the patient placed in bed in such a position as will relax the parts, until the ligature separates, this happening sometimes in ten days, though often not till much later.

REMARKS.—To avoid error in the first incisions, it has been advised to cut directly upon the belly of the sterno-mastoid muscle, and then to draw the wound towards the trachea, instead of cutting upon the inner edge of the muscle, as this, in the lower part of the neck, is liable to throw the operator upon the tracheal muscles instead of the sterno-cleido-mastoid. Mr. Chassaignac¹ has also advised the surgeon, in case of difficulty, to feel for the tubercle or projection made by the anterior branch of the transverse process of the sixth cervical vertebra (carotid tubercle), which is in front and a little inside the artery, if, in operating at the inferior third of the vessel, he finds the parts so infiltrated as to prevent their being recognized. I have tried this rule repeatedly upon the subject, and seldom failed to find the artery simply by the touch.

§ 2.—EFFECTS RESULTING FROM LIGATURE OF THE CAROTID.

When the circulation is cut off from one side of the head by the application of a ligature to the carotid artery, it is useful to know by what means nature remedies this obstruction to the natural course of the supply of blood intended for the head, and especially for the brain, as well as its effects upon this organ. From the free anastomosis found between the vessels supplying the head and upper part of the neck, it might readily be surmised that their enlargement would be the chief means employed by nature to compensate for the temporary loss occasioned by the operation, and such has been accurately found to be the result. From a dissection made by

¹ Malgaigne, p. 155.

Dr. Mott,¹ of New York, of a subject whose arteries were injected after a death consequent on a pulmonary affection, three months and nineteen days subsequent to the operation, it appeared that the carotid, which had been tied (right side), had been entirely obliterated from the innominate to the angle of the jaw, leaving a firm ligamentous cord divided into two parts at the point where the ligature had been applied. The vein and nerve were found to be perfectly natural; the right subclavian artery enlarged to a size equal to that of the innominate; the left carotid enlarged to twice its natural size, and its branches increased in the same ratio. The branches arising from the right subclavian artery were also enlarged. The inferior thyroid was enlarged in the ramus thyroidea, and the thyroideæ ascendens were twice their natural size; but the transversalis cervicis and transversalis humeri, though arising from the same trunk, retained their natural dimensions. The thyroidea ascendens was found mounting up the neck in a zigzag direction, forming many communications with the vertebral artery, and with the mastoid branch of the occipital. The left carotid artery was also equal in size to the innominate, and furnished the greatest part of the blood to the right side, the superior thyroid, lingual, pharyngeal, and internal maxillary arteries, inosculating with those of the opposite side, so as to have the appearance of continuous trunks. The mental, inferior labial, coronary, and facial were also found to anastomose freely with the same arteries from the right side. Although no direct mention is made of the condition of the right vertebral artery, there can be no doubt that it also participated in the enlargement seen in its parent subclavian, and thus materially aided the supply of blood to the brain by means of the circle of Willis.

Notwithstanding the numerous facts cited to show that, in most instances, no serious disturbance of the function of the brain ensues upon ligature of the carotid,² yet the reverse has been noted, the failures having been ascribed to some disorder or anomalous arrangement of the arteries chiefly concerned in equalizing the circulation after the operation. In a patient operated on by Mr. Key, who died almost immediately, the left carotid was found to be nearly obliterated at its origin from the aorta. In a case treated by Langenbeck, the patient suddenly presented alarming symptoms, and

¹ Amer. Journ. Med. Sciences, vol. viii. p. 45, 1831.

² Chelius, by South and Norris, vol. ii. p. 507.

PLATE XXXVI.

OPERATIONS UPON THE NECK.

Fig. 1. Ligature of the Carotid, Lingual, and Facial Arteries. C. Ligature of primitive carotid. 1. Lowest point of incision. 2. Fascia profunda. 3. Internal jugular vein. 4. Carotid artery raised on the aneurismal needle. 5. Par vagum nerve. L. Ligature of Lingual Artery. 1. External incision. 2. Fascia. 3. Lingual artery. F. Ligature of Facial Artery. 1. External incision. 2. Fascia. 3. Facial artery.

After Bernard and Huette.

Fig. 2. Surgical Anatomy of the Subclavian and Axillary Arteries. 1. Subclavian artery; as it passes from beneath the clavicle, it becomes axillary. 2. Axillary vein. 3. Brachial plexus of nerves. 4. Supra-scapular artery passing across the neck. 5. Omo-hyoid muscle. 6. Phrenic nerve. 7. External jugular vein. 8. Clavicular portion of sterno-cleido-mastoid. 9. Its sternal origin. 10. Clavicle sawed across. 11. Deltoid muscle. 12. Cephalic vein. 13. Pectoralis minor muscle. 14. Section of pectoralis major muscle.

After Bernard and Huette.

Fig. 3. Origin of the Carotid and Subclavian Arteries and Branches of the Subclavian. 1, 1. Aorta. 2. Innominata. 3. Primitive carotids. 4. Right subclavian. 5. Left subclavian. 6. Scalenus anticus muscle. 7, 7. Vertebral arteries. 8, 8. Thyroid axis. 9, 9. Posterior scapular arteries. 10, 10. Internal mammary.

After Bernard and Huette.

Fig. 4. Ligature of the Subclavian and Axillary Arteries. A. Ligature of subclavian. 1. Incision in skin. 2. Deep fascia. 3. Omo-hyoid muscle. 4. Brachial plexus. 5. Subclavian artery raised on the needle. 6. Scalenus anticus muscle. 7. Subclavian vein. B. Ligature of axillary below the Clavicle. 1. Incision in skin. 2. Deep fascia. 3. Fibres of pectoralis major cut across. 4. Axillary artery raised on the needle. 5. Axillary vein.

After Bernard and Huette.

Fig. 5. Relative Position of the Subclavian Vessels. 1. Subclavian artery. 2. Subclavian vein. 3. First rib. 4. Scalenus anticus muscle.

After Bernard and Huette.

Fig. 6. A view of the operation of Œsophagotomy. 1, 1. Incision in skin. 2. Deep fascia. 3. Blunt hook drawing trachea inwards. 4. The œsophagus. 5. Fingers of the surgeon drawing the bloodvessels outwards, so as to protect them during the incision in the œsophagus. 6. Bistoury incising the œsophagus. 7. Sterno-cleido-mastoid muscle drawn aside. 8. Internal jugular vein. 9. Primitive carotid artery.

After Bernard and Huette.

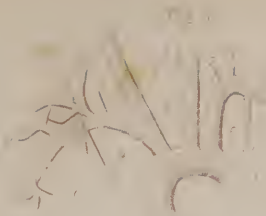


Fig. 1



Fig. 2



died thirty-four hours after the operation, in consequence, as is *supposed*, of some abnormal condition of the arteria communicans. Three patients in the hands of Molina, of Mayo, and of Sisco, suffered more or less, in the sight and hearing of the side operated on. A patient of Magendie, one of Baroven, one of Macauley, of Cooper, of Vincent and others, suffered from hemiplegia of the opposite side to that on which the artery was tied, thus indicating a lesion in the side of the brain corresponding with the artery.¹ It is better, therefore, in all cases to watch the effect upon the patient after tying the first knot before forming the second, so that, if requisite, the ligature may be removed from the vessel.

Though the ligation of one carotid has occasionally created these serious results, it has been successfully practised on both arteries, at intervals varying from two to six weeks, by Drs. McGill, Mussey, Mason Warren, Ellis, and Blackman in the United States,² and by several surgeons in Europe, and in these cases it is to be presumed that the vertebral arteries were in good condition. In a case in which both carotids were ligated simultaneously by Dr. Mott for extensive disease of the parotid gland, the patient died in twenty-four hours.³

Death also ensued upon a ligature of the primitive carotid by Dr. A. C. Post, of New York, one month after the operation, in consequence of phlebitis of the corresponding vein, pus being also found between the meninges of the brain.⁴

§ 3.—STATISTICS OF THE OPERATION OF LIGATING THE CAROTID ARTERY.

The attention of surgeons having been closely bestowed upon the results of the application of a ligature to the carotid artery, we are now able to form a tolerably correct estimate of the consequences of this operation, and, without specifying the diseases which required it, the following table will show the data from which an opinion may be formed:—

¹ Dict. de Médecine, tome vi., article Carotides.

² See Bibliography.

³ Am. Journ. Med. Sciences, vol. xiv. p. 530, 1834.

⁴ See Bibliography, p. 93.

TABLE.

	CURED.	DIED.	UNSUCCESSFUL.	DOUBTFUL.
Of 137 cases reported by Velpeau ¹	82	40	13	2
Of 128 cases reported by Dr. Norris, of Philadelphia ² (in reference to the cure of the disease)	69	50	9	
Of 21 cases reported by Dr. E. Crisp ³	10	11		
Of 7 cases reported by Dr. Lente, of New York ⁴	5	2		
Of 30 cases collected by myself, ⁵ from the operations of surgeons in the United States	22	8		
Of 8 cases of the ligature of both carotids	6	1	(simultaneous ligature)	
Total of cases, 331	194	112	22	2

From this table, it appears that in 331 cases the proportion of cures is 30, more than one-half of those operated on.

Of the cases reported by Velpeau, 32 were by surgeons in the United States, of which 27 were cured.

Of those reported by Norris, 38 were performed in the United States, of which 28 were cured; and Lente and myself report only those performed by American surgeons, being 45 in all (including those of both carotids), of which 33 were cured.

Total of cases in the United States, 115; of which there were cured, 88.

Total of those in Europe, 216; of which there were cured, 106; showing a decided result in favor of the surgeons of the United States, either in consequence of their subsequent treatment of the case, or, what is more probable, the better constitution and habits of the patients operated on.

§ 4.—LIGATURE OF THE LINGUAL AND FACIAL ARTERIES.

The ligature of the Lingual or Facial artery, though seldom required, may occasionally be demanded for the relief of tumors of the tongue or face, and may be accomplished as hereafter directed.

¹ Méd. Opératoire, tom. 2^{me}, p. 232.

² Am. Journ. Med. Sciences, vol. xiv. N. S. p. 13.

³ Lond. Med. Examiner, vol. ii. No. 3.

⁴ Transact. Amer. Med. Assoc., vol. iv. p. 326.

⁵ See Bibliographical Index, p. 91.

Although rarely demanded during life, the ligation of these arteries upon the subject, and especially the lingual, will be found to be a good operative exercise, and worthy of repetition by the student.

I. LIGATURE OF THE LINGUAL ARTERY.

ANATOMICAL RELATIONS.—The Lingual artery, after arising from the external carotid, will be found in the supra-hyoid region of the neck. In the early part of its course, it is concealed by the digastric and stylo-hyoid muscles; after which it penetrates the hyoglossus muscle, just above the cornu of the os hyoides, which is the first point of reference, or between it and the middle constrictor of the pharynx. It then ascends between the hyoglossus and the genio-hyo-glossus muscles, and, running forwards, lies between the latter muscle and the sublingual gland, which is the second point of reference. It may be ligated most readily at its nearest point to the os hyoides (Plate XXXVI., Fig. 1).

OPERATION OF MALGAIGNE.¹—Feel for the greater cornu of the os hyoides, and make an incision, one inch and a half long, and parallel to the greater cornu, through the skin, fascia superficialis, and platysma-myodes muscle, taking special care not to divide the facial vein, which runs obliquely across the incision. After exposing the submaxillary gland, which is readily recognized, push it upwards, and the bright tendon of the digastric muscle will be seen showing through the cellular tissue, half a line above which will be found the hypo-glossal nerve, which is to be drawn aside. Then, at one line below it, raise the hyoglossus muscle carefully, and dividing it transversely, the artery will be found directly beneath, unaccompanied by any vein or nerve. The first incision must not be extended too much towards the sterno-mastoid muscle, lest it involve the carotid region.

II. LIGATURE OF THE FACIAL ARTERY.

ANATOMICAL RELATIONS.—The Facial artery arises from the external carotid, a few lines above the lingual, and goes forward

¹ Op. Surgery, Philad. edit. p. 155.

within the angle of the jaw and above the submaxillary gland, with which it is closely connected, until it mounts over the base of the inferior maxilla just in advance of the anterior edge of the masseter muscle. When compression of the artery upon the jaw will not arrest the circulation on the side of the face, or when tumors about the submaxillary gland demand it, the ligature of this artery may be accomplished as follows (Plate XXXVI., Fig. 1):—

OPERATION.—Make an incision through the skin and fascia, an inch and a quarter long, obliquely across the jaw-bone, from the masseter muscle towards the angle of the mouth. Then, lacerating the cellular tissue with the director, and pushing the accompanying veins to each side, apply the ligature carefully around the artery, so as not to include any nervous filaments.

CHAPTER IX.

LIGATURE OF THE INNOMINATA AND SUBCLAVIAN ARTERIES.

As a remedy for the relief of aneurismal tumors of the carotid, or of the subclavian artery close to the clavicle, the ligation of the innominate or of the subclavian within the scaleni muscles has been practised. Before showing the plans that have been resorted to for the accomplishment of this object, a brief reference must be made to the relative position of the parts concerned.

SECTION I.

SURGICAL ANATOMY OF THE INNOMINATA AND SUBCLAVIAN ARTERIES.

The Aorta, in forming the arch which permits it to pass from the heart downwards into the thorax, rises to within eight or twelve lines of the superior edge of the sternum, and at this point gives off the Innominate and Left Carotid and Subclavian Arteries.

§ 1.—ANATOMICAL RELATIONS OF THE INNOMINATA.

The trunk of the Innominata artery, which is from an inch to an inch and a half long, or rarely two inches, arises from the arch of the aorta as just stated, and extends to near the level of the sternoclavicular articulation, where it gives off the right subclavian and right carotid arteries. In this short course it passes obliquely from below upwards, from within outwards, and from before backwards; is very nearly in contact on its outer side with the top of the pleura; rests against the front and right side of the trachea; is crossed on its anterior face by the left transverse vein, and lower down by the vena cava descendens, which is parallel to it, but more and more distant as it approaches the heart.¹ It is covered by the skin, superficial and deep cervical fasciæ, by cellular tissue, by the origins of the sterno-hyoid and thyroid muscles, and by a portion of the sternoclavicular articulation. (Plate XXXVII., Fig. 3.)

§ 2.—ANATOMICAL RELATIONS OF THE SUBCLAVIAN ARTERY.

The Subclavian artery of the right side arises from the Innominata, and that of the left from the arch of the aorta. Each crosses the first rib of their respective sides in the interval between the scalenus anticus and medius muscles, and, passing between the subclavius muscle and the rib, escapes from under the clavicle, and is thence known as the Axillary artery. The right subclavian is much shorter and more superficial than the left from its origin to the scaleni muscles. Near these muscles, both arteries are covered in front by the sternal end of the clavicle; by the sterno-hyoid and thyroid muscles, and by the subclavian vein of the corresponding side. Behind them is the longus colli muscle; below them, the pleura, the left artery being in contact with it for its whole length in the thorax, and on their internal side is the primitive carotid artery. Near the scalenus anticus, the right subclavian artery is crossed by the par vagum nerve, whilst the phrenic nerve is found in front of it, but on the internal edge of the scalenus muscle.

The Left Subclavian artery runs nearly vertically from its origin to the interval in the scaleni muscles; is nearly parallel with, but

¹ Dict. de Méd., tom. xxviii.

behind the left primitive carotid; has the phrenic nerve in the same relative position as the artery on the right side, though the left par vagum goes parallel with and in front of the artery for some distance along its root. At the inner margin of the scaleni muscles, on both sides, is found the thyroid axis or cluster of five branches. The sympathetic nerve is generally behind the root of the artery on the right side, whilst on the left, the thoracic duct is very near its posterior face, and usually crosses it above before emptying into the left subclavian vein.

Having become horizontal, the subclavian arteries present the same relation on both sides, and lie directly on the first rib, the insertion of the scalenus anticus muscle separating them from the subclavian vein. All the nerves of the brachial plexus form a network around the arteries resembling the plaiting of a whipcord.

Outside the scaleni muscles, the subclavian artery corresponds to the supra-clavicular fossa, and rests upon the first intercostal space. The subclavian vein, which covers the artery while descending towards the clavicle, receives at this point the subscapular vein, external jugular, and sometimes the acromial veins. The brachial plexus accompanies the artery thus far, but soon afterwards passes behind it. The artery is, therefore, generally found in a triangular space formed by the omo-hyoid muscle on the outside, the scalenus anticus on the inside, and the clavicle below.¹

SECTION II.

LIGATURE OF THE INNOMINATA ARTERY.

The difficulties attendant on the application of a ligature to the Arteria Innominata may be readily understood when reference is had to its anatomical relations, as well as to the changes likely to be created in the surrounding parts by the formation of such an aneurism as would lead to its execution. This operation has been performed ten times,² and in every instance resulted in death: to wit, first by Dr. Valentine Mott, of New York; second, by Græfe, of Berlin; third by Bland; fourth, by Dr. J. Wilmot Hall, of Baltimore; fifth, by Kuhl, of Leipsic; sixth, by Lizars, of England;

¹ Horner's Anatomy, vol. ii. p. 215.

² Dict. de Méd., tom. xxviii. p. 448.

seventh, by Arendt, of Russia; eighth and ninth, by Bujalski, of St. Petersburg; and tenth, by Hutin, for a wound.¹

In order to obviate the numerous difficulties attendant on this operation, various plans of proceeding have been recommended; but this account will be limited to the method of Dr. Mott, as it is generally admitted to expose the parts as freely as is safe, and is also sanctioned by the experience of Malgaigne and others, who regard it as the best that can be employed, if the operation should be again resorted to.

The appearance of the tumor, and the incisions required in the operation, are shown in Plate XXXVII., Fig. 2, for a special drawing of which I am indebted to the politeness of Dr. Mott, it being believed by him to do justice to the appearance of the parts.

OPERATION OF DR. MOTT, OF NEW YORK, May 11, 1818.—The patient being placed in a recumbent position upon a table of the ordinary height, a little inclining to the left side, so that the light might fall obliquely on the upper part of the thorax and neck, and the surgeon seated on a bench of convenient height, an incision was commenced upon the tumor just above the clavicle, and carried close to this bone and the upper end of the sternum, so as to terminate immediately over the trachea, the whole cut being about three inches long. Another incision, about the same length, being then made from the termination of this along the inner edge of the sterno-mastoid muscle, the integuments were dissected back from the platysma-myodes muscle, beginning at the lower angle of the incision, when the flap was turned over upon the tumor and side of the neck.

After cutting through the platysma-myodes, the sternal origin of the sterno-mastoid muscle was cautiously divided in the direction of the first incision, and also reflected over the tumor (Plate XXXVII., Figs. 2 and 3), when the sterno-hyoid muscle was divided, and then the sterno-thyroid, both being turned up on the opposite side of the wound over the trachea, so as to expose the sheath of the carotid artery. This sheath being now cautiously opened a little above the sternum, the nerve and vein were drawn to the outside, the artery drawn towards the trachea, and the subclavian laid bare about a half inch from its origin, the handle of the scalpel being mostly employed in order to avoid injuring these parts.

¹ See Bibliography, p. 91.

Whilst separating the cellular substance from the artery with the smooth handle of the scalpel, a branch of an artery was lacerated, which yielded for a few minutes a smart hemorrhage. It was about half an inch distant from the innominate, and about the size of a crowquill; but the bleeding ceased upon a little pressure.

The bifurcation of the innominate being now in view, the dissection was mainly done with Dr. Parrish's knife (Plate XXXV., Fig. 1), care being taken to keep it directly over and along the upper surface of the artery. After fairly denuding the vessel on its upper surface, the cellular substance was very cautiously separated from the sides of it by the handle of the scalpel, so as to avoid injuring the pleura, and a round silk ligature being passed by means of the Philadelphia needle (Plate XXXV., Fig. 2), the artery was tied about half an inch below its bifurcation, the recurrent and phrenic nerves being undisturbed.

In introducing one of the smallest blunt needles (Plate XXXV., Fig. 5) around the artery, the instrument was passed from without inwards, so that the cellular substance and the pleura could be pressed down with a part of the instrument, whilst the point was very carefully insinuated under the artery from below upwards, so as to appear on the opposite side of the artery. The hook (Plate XXXV., Fig. 9) being then introduced into the eye of the needle, the shank was unscrewed and the needle drawn through with the utmost facility, leaving the ligature *in situ*, after which the knot was gradually tightened.

The integuments being then closed tightly, the patient was put to bed with a pulse beating sixty-nine, ten minutes after the operation.

This patient subsequently did so well that, on the fourteenth day, the ligature separated. On the twentieth day he walked several times across the yard, but on the twenty-third day was attacked with hemorrhage from the wound, which recurred at intervals, till on the twenty-sixth day after the operation, he died.¹

REMARKS.—The want of success attending the performance of this operation in so many able hands (it having resulted fatally in every instance) has, at present, generally proscribed the operation from the list of those that are justifiable in cases of aneurism.

The dissection of Dr. Mott's patient showed that a firm clot had

¹ Mott, Velpeau; also Eclect. Repertory, vol. ix., and other journals.

formed in the artery below the ligature, and that ulceration of the opposite side of the artery was the source of the hemorrhage. Græfe's operation in 1822 apparently did well for sixty-eight days, but then hemorrhage ensued upon the patient's exerting himself. Blandin, in 1837, lost his patient by hemorrhage on the eighteenth day. Hall lost his on the sixth day also by hemorrhage; and the patient of Mr. Lizars died in ten days of hemorrhage, the chest containing twenty ounces of blood, the subclavian artery alone being diseased. Judging from these results, Velpeau has therefore expressed the decided opinion "that the operation ought not to be attempted, at least for the cure of aneurism."¹

The little success that has followed this operation renders a reference to the operations of Brasdor and Wardrop, or the application of a ligature on the distal side of the tumor, essential to a knowledge of the best method of treating aneurisms of this vessel, and it should be deliberately considered before repeating the ligature of the innominata. According to Mr. Wardrop's views, the cure of an aneurism of the innominata by the application of a ligature to either the subclavian or the common carotid artery, corresponds with the course taken by nature in effecting the cure, as is shown in several preparations now in the Museum of the Royal College of Surgeons. In addition to which, Mr. Wardrop has collected eight cases of aneurism of this vessel thus operated on, in five of which there was consolidation and diminution of the tumor, and though in three others the operation failed, one lived a month, the second died in a few hours, and the third was benefited for the time, only dying on the increase of the tumor. This success, as compared with that consequent on the ligation of the innominata itself, is certainly very great, and his method of treatment should, therefore, receive that consideration which so serious an operation must certainly obtain in the mind of every judicious operator. In selecting one of two vessels (either the subclavian or the carotid), Mr. Wardrop prefers the carotid; as this vessel was found in his preparation to be the one most frequently obstructed by the natural formation of a clot.

¹ Dict. de Méd., tome xxviii. p. 474.

SECTION III.

LIGATURE OF THE SUBCLAVIAN ARTERY.

The ligature of the Subclavian Artery is an operation which dates back only to the commencement of the present century, having been first successfully performed by Mr. Keate, of England, in March, 1800; by Ramsden unsuccessfully in 1809; after which it was successfully ligated in 1815, by Chamberlaine, and then by Dr. Wright Post, of New York, in September, 1817,¹ this being the first time the operation was performed in the United States. Since this period, it has been frequently attempted both in Europe and the United States, being performed by Dr. Dudley, of Lexington, in 1826; by Gibson, of Philadelphia, in 1828; by Wells, of Carolina, in 1828; by Mott, of New York, in 1831; by the same surgeon within the scaleni, in 1833; also by him upon the left subclavian, outside the scaleni, in 1834; and by Kearny Rodgers, of New York, within the scaleni muscles, in 1845, this being the first operation ever performed at this point. By a reference to the Bibliographical Index,² it will also be seen that many other American surgeons have succeeded in ligating the artery at the usual place.

The ligature of the subclavian artery may be performed in any portion of its course, though it is generally admitted to be accompanied by many difficulties, and to require perfect anatomical as well as surgical skill, no matter what portion of it may be chosen.

Three different points have been selected for the application of this ligature, the choice being usually directed by the necessities of the case. These points are usually designated as the operation upon the first rib; that between the scaleni, and that within the muscles, the difficulties being greater in most of them, when it is necessary to operate upon the artery of the left side. As the clearest account of the operative proceedings, I have selected those furnished by Malgaigne and Velpeau, adding to them a few of the steps taken by the American surgeons whose cases are referred to in the Bibliographical Index.

"To expose the artery on the first rib, it is necessary to divide the skin, subcutaneous cellular tissue, superficial fascia, and pla-

¹ Norris, Am. Journ. Med. Sciences, vol. x. N. S. p. 14.

² See Bibliography, p. 95.

tysma-myodes muscle; the fascia profunda colli, and a loose cellular tissue full of venous branches and lymphatic ganglia, in which run two important arteries, the transversalis cervicis being placed some lines above the subclavian and the superior scapula, running along the posterior border of the clavicle. Sometimes the sterno-mastoid muscle, from its wide origin along the clavicle, requires division, whilst the external jugular vein, from running more outwards than usual, requires to be avoided."¹

In the latter stages of the operation, the following test of the position of the artery, which I have never known to fail, and which was suggested originally by Dr. Jos. Parrish, of Philadelphia,² will prove valuable, and that is, to notice the position of the tubercle or prominence on the first rib into which the scalenus anticus muscle is inserted, as the artery is invariably found on its outer side.

In the directions usually given by the French surgeons for the ligature of this artery, much stress is laid by them upon the importance of recognizing this prominence of the first rib as a point of reference, and on the many occasions in which I heard it referred to at Clamart, and the Ecole Pratique of Paris, in 1839, I supposed that the suggestion was due either to Lisfranc, Velpeau, or Malgaigne, especially as the latter also mentioned it in his Manual of Operative Surgery. Subsequent reading has, however, induced me to think that this valuable direction originated in the United States, with the late Dr. Jos. Parrish, of Philadelphia, though, as I am unable to find any date in connection with the accounts of the French surgeons, I cannot be positive on the subject. A perusal of the paper of Dr. Parrish³ will, however, show that he published the description of this important landmark to the position of the artery in the year 1813, four years after Ramsden's operation, and this, I think, is the earliest notice taken of an infallible rule for finding the artery.

The high estimate generally entertained of the accuracy of this point of reference, renders it desirable to credit correctly the author of the suggestion, and in claiming it for Dr. Parrish, there is every reason to think that nothing more than justice is done to the memory of a surgeon whose experience as an operator is well known throughout the United States.

¹ Malgaigne, Philad. edit. p. 148.

² Eclectic Repertory, vol. iii. p. 240. Philad. 1813.

³ Eclectic Repertory, *loc. citat.*

§ 1.—LIGATURE OF THE SUBCLAVIAN ARTERY ON THE FIRST RIB.

PARRISH'S RULE FOR FINDING THE SUBCLAVIAN ARTERY.—The depth at which the subclavian is placed rendering it very difficult to recognize the position of the vessel by the sight alone, the suggestion of Drs. Parrish, Hewson, and Hartshorne, referred to in Dr. Parrish's paper, will prove highly serviceable. It is as follows: After dividing the external tissues, pass the finger down to the superior edge of the first rib, and sliding it along this towards the sternum, feel for the insertion of the scalenus anticus muscle. The tubercle at this point is very perceptible to the touch, and the artery will be found close upon its outer side.

ORDINARY OPERATION.—The patient lying down with the head secured and the shoulder drawn downwards and slightly forwards so as to depress the clavicle, make an incision immediately above the bone parallel to its posterior border, commencing one inch outside its sternal end, and extending to the insertion of the trapezius muscle, and, after cautiously dividing the skin, draw the external jugular vein, if it shows itself, inwards, by means of a blunt-hook. Then, cutting across the superficial fascia and platysma-myodes muscle, cautiously open the fascia profunda colli, and laying aside the knife tear the cellular tissue with the finger-nail or point of the director. On carrying the forefinger into the internal angle of the wound, feel, as directed by Dr. Parrish, for the scalenus tubercle of the first rib, and, reaching it, the artery will be felt pulsating on its external side. Then, whilst keeping the finger upon this tubercle as a guide, pass the aneurismal needle carefully under the vessel from its inner side, and bring it out externally, holding the artery with the finger to prevent its slipping. Then, placing a finger between it and the first fasciculus of the brachial plexus of nerves, so as to preserve them from injury, facilitate the passage of the needle by depressing the shoulder and turning the patient's head to the opposite side.¹

REMARKS.—As this method of operating exposes the surgeon to the risk of wounding the external jugular vein, Roux advises that the incision should be made perpendicularly to the clavicle, and I have found his mode of operating quite easy upon the subject.

¹ Malgaigne.

A somewhat similar, but more accurate method of operating is as follows:—

NEW METHOD.—Make an incision perpendicular to the clavicle by dropping a line from the point where the anterior edge of the trapezius and posterior margin of the sterno-mastoid muscle meet (supra-clavicular fossa), so as to divide this triangular depression into two triangles, and then dissect or lacerate the tissues until the artery is distinctly felt.

REMARKS.—This mode of reaching the subclavian was suggested many years since by the late Dr. Horner, of Philadelphia, and protects the surgeon not only from the risk of wounding the vein, but also from injury of the transverse vessels, so often found near the subclavian artery, should the transverse incision fall too near the sternal end of the bone.

§ 2.—LIGATURE OF THE ARTERY BETWEEN THE SCALENI MUSCLES.

OPERATION OF DUPUYTREN.—Make at the base of the neck a transverse incision extending from the anterior edge of the trapezius to the inner border, or to a short distance upon the outer side of the sterno-mastoid muscle, cutting through the different layers as before mentioned. Having found the insertion of the scalenus anticus, insinuate between its posterior surface and the front of the artery a grooved director, and divide the muscle upon it, when the retraction of the muscle will lay bare the artery, and enable the needle to pass under it from without inwards.¹

REMARKS.—In this operation, caution has always been given respecting the position of the phrenic nerve, which, it will be recollected, lies against the internal side of the scalenus anticus, and a little anterior to it. But Mr. Malgaigne² also advises that attention should be given to the internal mammary artery which runs outside of this nerve, and is much exposed if the cut is made too near the rib.

¹ Velpeau.

² Malgaigne, Philad. edit., p. 150.

§ 3.—LIGATURE OF THE SUBCLAVIAN ARTERY WITHIN THE SCALENI MUSCLES.

This operation, which was first performed by Mr. Colles, of Dublin, who lost his patient on the eighth day, has since been repeated several times in Europe and this country, Dr. Mott, of New York, performing the second operation.

OPERATION OF DR. MOTT ON THE RIGHT SUBCLAVIAN ARTERY.¹—The patient being placed upon the table with the shoulders elevated, the head thrown backwards, and the face and body inclined to the left side, an incision was begun at the lower part of the outer edge of the sternal origin of the sterno-mastoid muscle, and carried upwards about two inches. Another, commencing at the same point, was then made along the upper surface of the clavicle for the same extent. When the triangular flap of skin, with the corresponding portion of the platysma, and its investments, was separately dissected and turned aside, the clavicular portion of the mastoid muscle was severed immediately upon its insertion, and reflected upon the neck. This laying bare the deep-seated fascia, the latter was raised with the forceps, and divided a little below the course of the omohyoid muscle, on the outside of the deep jugular vein. On enlarging this opening an inch downwards, the adipose and cellular tissues were readily pushed aside, and the scalenus anticus muscle exposed to view. The cellular substance being now separated with the fingers and handle of the knife, the artery was exposed just within the thyroid axis, the branches of which could be plainly seen. The filamentous tissue being then raised from the artery with the forceps and cautiously divided, the ligature was passed under the vessel from below upwards by Dr. Parrish's needle, curved spatulæ being employed to draw the deep jugular vein towards the trachea as well as to separate the edges of the wound. Three small arteries were tied, no vein required the ligature, but on the eighteenth day the patient died of secondary hemorrhage.

¹ Amer. Journ. Med. Sciences, vol. xii. p. 354, 1833.

§ 4.—LIGATURE OF THE LEFT SUBCLAVIAN ARTERY WITHIN THE
SCALENI MUSCLES.

Although the right subclavian artery has been occasionally ligated on the cardiac side of the scapular muscles, Dr. J. Kearny Rodgers, of New York, was, I believe, the first surgeon who succeeded in tying the left subclavian within these muscles, such an operation being regarded as impracticable prior to his case. It was performed under the following circumstances:—

A German, 42 years of age, was admitted September 13, 1845, into the New York Hospital, with an aneurismal tumor above the clavicle, about the size of a small hen's egg, extending externally to the outer third of the bone, and covered internally by the outer edge of the sterno-mastoid muscle. A consultation having left the decision of an operation to Dr. J. Kearny Rodgers, this gentleman concluded, after mature reflection, that the operation was possible, and therefore determined to try it.

OPERATION OF DR. J. KEARNY RODGERS.¹—The patient being placed on a low bed, with his head and shoulders raised, and his face turned to the right side, so that the light from the dome could shine directly on the part to be operated on, an incision three inches and a half long was made on the inner edge of the sterno-mastoid so as to terminate at the sternum, and divide the integuments and platysma-myodes. This was then met by another incision, which extended along the sternal extremity of the clavicle, about two and a half inches, and divided a plexus of varicose veins which were in the integuments covering the clavicle, and communicated with the subclavian vein. To check the free bleeding which occurred from their cut extremities, it therefore became necessary to tie them.

The flap of integuments and platysma-myoides being now dissected up, and the lower end of the sterno-cleido-mastoid laid bare, a director was passed under this muscle, and the sternal as well as half of the clavicular origin divided by a bistoury. This muscle being now turned up, the sterno-hyoid and omo-hyoid muscles, as well as the deep-seated jugular vein, were seen covered by the deep cervical fascia.

¹ Am. Journ. of Med. Sciences, vol. xi. N. S. p. 541.

PLATE XXXVII.

OPERATIONS PRACTISED AT THE LOWER PORTION OF THE NECK.

Fig. 1. A view of the operation for the Strangulation of a large Goitre which was inducing strangulation, as performed by Liston. By a crucial incision the skin has been dissected from the tumor, which is then caused to slough off by strangulating it by means of ligatures carried through and around its base by needles. This tumor sloughed off in eight days. 1. Sterno-hyoid and thyroid muscles divided and turned down. 2. Upper portion of the same. 3. Os hyoides. 4, 4. Enlarged veins on surface of tumor. After Liston.

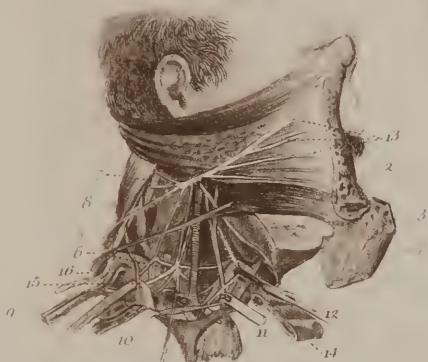
Fig. 2. A view of Mott's operation for Ligature of the Innominata. 1. Aneurismal tumor of the Subclavian. 2. Skin and platysma-myoides turned back. 3. Section of sternal origin of sterno-cleido-mastoid muscle. 4. Arteria innominata. After Mott.

Fig. 3. View of the relative position of the parts concerned in this operation. 1. Vertical incision. 2. Corresponding edge of skin. 3. Flap everted. 4. Sterno-mastoid muscle. 5. Arteria innominata. 6. Internal jugular vein. 7. Origin of subclavian artery. 8. Vertebral artery drawn forwards. 9. Inferior thyroid artery. 10. Internal mammary. 11. Transversalis cervicis artery. After Bourguery and Jacob.

Fig. 4. A view of the position and arrangement of the Bloodvessels and Nerves of the Neck, as shown by turning off the Clavicle. 1. Trapezius muscle. 2. Sterno-cleido-mastoid. 3. Sterno-thyroid muscle and thyroid gland. 4. Upper portion of sternum. 5. Omo-hyoid muscle. 6. One of the cervical ganglia of the sympathetic nerve. 7. First cervical plexus. 8. Right primitive carotid. 9. Subclavian vein. 10. Ligature on subclavian artery. 11. Hook holding down internal jugular vein. 12. Hook holding par vagum nerve. 13. Branches of spinal accessory nerve. 14. Section of second rib. 15. Phrenic nerve. 16. Aneurismal tumor of the subclavian artery. After Auvert.

Fig. 5. Surgical anatomy of vessels just above the clavicle, as connected with the ligature of the Subclavian Artery. 1. Incision in skin. 2. Scalenus anticus muscle. 3. Omo-hyoid. 4. Subclavian vein. 5. External jugular vein. 6. Transverse cervical. 7. Superficial artery. 8. Subclavian artery outside the scalenus muscle. 9. Supra-clavicular nerves. 10. Roots of brachial plexus. 11. Phrenic nerve. After Auvert.

Fig. 6. Excision of the clavicle as performed by Dr. Warren. The skin has been turned back by a crucial incision, and the bone being sawed across near its humeral end, is represented as raised by a ligature so as to favor its disarticulation. After Nature.





On turning up the sterno-mastoid, a portion of the aneurismal sac was seen strongly pulsating and overlapping about half the width of the scalenus, so as to form the outer half of the track through which it was necessary that the operator should pass, showing fearfully one of the dangers of the operation, but one which Dr. Rodgers had anticipated. The deep fascia being then divided by the handle of the scalpel and the fingers, the dissection was continued in contact with the outer side of the deep jugular vein to the inner edge of the scalenus anticus muscle, for the purpose of reaching this muscle fully half an inch above the rib, instead of at its insertion, in order to guard against any injury of the thoracic duct. The phrenic nerve could now be distinctly felt running down on the anterior surface of the scalenus, and was of course avoided, until, by pressing the finger downwards, the rib was discovered, when after some little search the position of the artery was recognized. By pressing the vessel against the rib, all pulsation in the tumor ceased, whilst on removing the finger the pulsation returned. In order to avoid any injury to the pleura and thoracic duct in detaching the artery, Dr. Parrish's needle was employed after that of Sir Philip Crampton had been tried, the point of the former being introduced under the artery, and directed upwards so as to avoid the pleura. The needle being detached from the shaft of the instrument, the ligature was drawn upwards so as to surround the artery, and then tightened with the forefingers at the bottom of the wound, all pulsation ceasing immediately in the tumor, and also in the arteries of the extremity. Warmth was subsequently applied to the limb, and the usual treatment pursued. On the thirteenth day, the patient, on changing his position from the right side to his back, was attacked with hemorrhage, of which he died two days subsequently, or fifteen days after the application of the ligature. A *post-mortem* examination, after detailing other points, established the inaccuracy of one fact, which had been previously urged as an argument against the operation, to wit, the chances of hemorrhage from the want of sufficient adhesions in the artery. In this case there was a perfect coagulum found in the vessels, the hemorrhage had come from the distal end of the artery in consequence of the free communication of the internal carotid at the base of the brain with the vertebral, the latter vessel having been given off from the subclavian just beyond the point where Dr. Rodgers had applied his ligature. Decidedly the greatest danger in

the operation was thought by the operator to be the risk of wounding the pleura and thoracic duct.

§ 5.—STATISTICS OF THE OPERATION OF LIGATING THE SUBCLAVIAN ARTERY.

Of sixty-nine cases reported by Dr. Norris, of Philadelphia,¹ thirty-six recovered and thirty-three died, or a few more than one-half recovered. Of fifty-four cases, in which the affected side is mentioned, thirty-one were on the right and twenty-three on the left side.

Of the fifty cases reported by Velpeau² (several of which have been also counted by Dr. Norris), twenty-three died and twenty-seven were cured. Of the twenty-three cases in which the left artery was tied, as reported by Dr. Norris, fifteen were cured and eight died; but there is no mention made of any of these having been performed on the left side within the scaleni muscles.

Of twenty-six cases of aneurism, reported by Mr. Crisp,³ ten were ligated successfully, one was cured by pressure, and five died after the application of the ligature from hemorrhage.

Of eighteen cases of the ligature of the subclavian collected by myself,⁴ fourteen were cured and four died. Of seventeen performed in the United States, and reported by Norris, eleven were cured and six died. Of the thirty cases, therefore, in the United States, twenty-one were cured and nine died.

On summing up these one hundred and fifty-eight cases, eighty-three are mentioned as cured, out of the whole number reported in the tables. It appears, therefore, that the successful cases have been four more than one-half of those operated on, but that the ligature within the scaleni muscles has been by far the most fatal of all, the deaths ensuing chiefly from hemorrhage or from inflammation of the pleura or pulmonary organs.

The anatomical relations of the pleura to these arteries sufficiently explain this result.

¹ Am. Journ. Med. Sciences, vol. x. N. S. p. 18.

² Operat. Surgery, by Mott, vol. ii. p. 219.

³ London Med. Examiner, No. 8, vol. ii. p. 209.

⁴ Bibliographical Index, p. 95.

§ 6.—ANATOMICAL PHENOMENA CONSEQUENT ON THE LIGATION OF
THE SUBCLAVIAN ARTERY.

After applying a ligature to a large artery, and thus for a time cutting off the supply of blood from the extremity which it has previously nourished, it becomes a matter of some interest to learn in what manner nature can adapt herself to the change, and remedy the evil that it might be supposed would ensue. The following account, furnished in connection with the dissection of two of the operations practised on the subclavian, will therefore it is thought prove instructive to the student by exhibiting the anatomical changes consequent on the obstruction caused by the ligation of the main channel of this artery.

In the account of the autopsy, furnished by Dr. F. S. Ainsworth,¹ of Boston, of a patient on whom a ligature had been applied (four years previously) to the left subclavian artery at the external border of the scalenus anticus muscle, we find "that the injecting matter which was thrown into the aorta of the subject passed readily into all the vessels of the left arm and hand; that the arterics and veins of the neck, as well as the brachial plexus of nerves for the space of three inches above the clavicle, were imbedded in a dense fibro-cartilaginous substance, and that the subclavian artery was completely obliterated and reduced to a mere fibrous-looking cord at the point where the ligature had been applied. Three-fourths of an inch from this spot the vessel, however, nearly regained its usual size, and continued throughout its whole course of the normal dimensions and distribution, the collateral circulation being maintained by the intercostal branches of the internal mammary through the thoracic branches of the thoracico-acromialis, and by a large inosculation between the supra-scapular and a terminal branch of the sub-scapular arteries. A communication was also traced between some small muscular branches of the transverse cervical and the thoracico-acromialis. An irregularity which is not uncommon was also noted in the transversalis cervicis artery, which was given off from the thyroid axis in a common trunk with the posterior scapular, and formed a large trunk, which, running parallel to the clavicle, so as to correspond at first with the course of the subcla-

¹ Am. Journ. Med. Sci., vol. xix. N. S. p. 84.

vian, might readily have been wounded or ligated in mistake for the subclavian itself." From the information furnished by the dissection of another anomalous distribution in these vessels, Dr. Ainsworth suggests that it may be well hereafter to secure both extremities of the main artery so as to avoid the hemorrhage that has sometimes ensued in the operation from the collateral circulation.

In the report of the dissection of a patient operated on by Dr. J. Mason Warren¹ for the ligature of the left subclavian, one year previous, it was shown that the subclavian was of its original size as far as the scalenus anticus, where it suddenly terminated, whilst the vessels forming the thyroid axis were twice their natural size, the internal mammary being enlarged and given off from the thyroid. It was through this vessel, by means of the inosculation of the intercostal arteries with the thoracic, and of the posterior scapular with the sub-scapular, that the collateral circulation had been accomplished.

¹ Am. Journ. Med. Sci., vol. xxi. N. S. p. 53.



